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EDITED BY

G. STANLEY HALL
President of Clark University and Professor of Psychology and Education

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HOME ECONOMICS

By ELLEN COPE, Wellesley, Mass.

I. THE HOME ECONOMICS MOVEMENT

If we look back to discover when and how this now well established movement had its beginning, we find that so long ago as 1789, girls in the Boston Public Schools were allowed to spend some time on needlework under direction. In 1821 Mrs. Emma Willard opened a course in Household Arts in Troy Female Seminary. Lessons in cooking were given by a Professor Blot in several of the large cities in the years 1859 to 1860. In 1862 the government began to take an interest and Congress passed an Act which provided for the establishment of the so-called *Land Grant Colleges,* in which should be taught " such branches of learning as are related to agriculture and the mechanical arts in order to promote the liberal and practical education of the industrial classes in the several pursuits and professions of life." A four year course in Domestic Science was introduced into the University of Illinois in 1875-76. During the next twenty-five years departments were opened in colleges and universities, special courses were given in private schools and to the children in public schools. It is interesting to note that in 1890-91 a course in sanitation and dietetics was given at Wellesley. At the time of the last investigation by the government, some four years ago, there were over one hundred colleges and universities or other institutions of collegiate grade giving instruction in Home Economics. The largest group offering a four years' course leading to a degree were the Land Grant Colleges. Besides these there are normal schools, " secondary and high," special domestic science and industrial schools, also schools for Indians and Negroes, and elementary and secondary schools. The total number of institutions in the United States known to be giving instruction in Home Economics at that time was over twelve hundred.

In addition to these schools there are correspondence schools, bulletins, magazines and clubs for the help of the housewife who cannot be away from home for special study.

The *American Home Economics Association,* organized in 1909 by Mrs. Ellen H. Richards and comprising teachers of Domestic Science, home-makers, teachers, sanitarians and economists from all over the country, is perhaps the greatest expression of the widespread interest in the subject. A world-wide association of educators from many European countries and the United States concerns itself with a closely related phase of this work. The child in the home is considered rather than the arts and sciences which make possible a suitable home. Under the name of the *IIme Congrès International d'Education Familiale* the association held its last meeting in Brussels in August, 1910.

In an article on University Professional Schools for Women (Report of the *Congrès International*), Dr. Benjamin R. Andrews, secretary of the Schools of Household and Industrial Arts of Columbia University makes a comment, the idea of which is not infrequently expressed by thinking men of various professions:

> "To-day practically every state college and university possesses co-ordinate with its professional schools for men, departments or schools of Household Science for women. Strangely enough the women's colleges (those receiving women only) have done least in introducing the special courses in Household Science and ordinarily have only the academic curricula. The curricula of these women's colleges represent an effort extending over fifty years to secure for women the same educational advantages as for men, namely, the academic collegiate courses which fifty years ago represented all of men's education. Meantime men's education has differentiated into all the professional schools. Equally, women's must now differentiate and the departments of Household Science in co-educational universities are a movement in this direction."

Upon investigation of a dozen or more catalogues of schools and universities, we find as a rule three classes of students recognized by the departments of Home Economics; (1) those who wish such training as will enable them to manage their homes more scientifically, (2) those who wish to do institutional management work in hospitals, asylums, college dormitories, lunch rooms, etc., and (3) those who wish to teach domestic science in the public schools or higher institutions of learning.

As the school of Household and Industrial Arts of Teachers College, New York, is probably the most advanced in the country, it will be taken as typical of what is best in this line of work. The curricula offered by this school are stated under these headings: Household Arts Education, Nurses Education and Health Protection, Household Administration and Dietetics, Household Decoration, Applied Arts and Special Courses. As our chief interest is in the courses which concern home-makers, the Household Arts, Household Administration and Household Decoration are the only sections which need be examined. The Nurses' Education and Health course, though not to be discussed here, has undoubtedly a value for home-makers in some of its aspects. Strangely enough, there is a course, among others, more strictly medical, which would seem quite as properly to belong in the course for Home-makers—the Care of Infants and Small Children—for which the Department of Physical Education and Kindergarten have contributed what they have of value for the students of nursing and health. These topics are discussed: The basis in physiological knowledge for the rational care of the child; the basis of early mental and moral training; the physical care of the child from the third to the sixth year,—its food, sleep, bath, clothing, habits, occupations.

The school of Household Arts "provides training for teachers of all grades in the special fields of the Arts and Sciences, including for advanced students graduate study and preparation for university and college professorships in home economics and its various divisions. Preparation is also provided for supervisors of Domestic Science and Art in public schools and heads of departments of Domestic Science and Domestic Art in Normal and Teachers' Training Schools: also professional training for teachers in secondary, grammar and elementary schools."

For the teachers of Domestic Art there are courses in General and Educational Psychology, History and Principles of Education, Theory and Practice of Teaching Domestic Art, *Applied Handwork, Textiles, Garment making, Dress making, Millinery, Household Art Design* and *Costume Design*. For teachers of Domestic Science there are General and Educational Psychology, History and Principles of Education, Theory and Practice of Teaching Domestic Science, Domestic Science for Schools, *Dietetics, Food Production, Household Chemistry, Physiological Chemistry, Experimental Cookery*.

For the supervisors of Domestic Art or Domestic Science special courses are given.

The two year curriculum in the School of Household Administration " for professional superintendents and managers, matrons and professional housekeepers in private households and in institutional households, colleges and school dormitories, asylums, hospitals, and other large institutions, dietitians and managers in commissary departments in such institutions " offers courses in General and Educational Psychology, *House Structure, Housefitting and Sanitation, Household Management, Buying, Food Production and Manufacture, Household Chemistry, Applied Bacteriology, Food Economics, Home Cookery and Table Service,* Institutional Cookery, and *Dietaries.*

The courses offered to those preparing for professional work in house decoration are: *Art Appreciation and History of Art, History of Design, Principles of Design,* Drawing and Painting, Mechanical Drawing, Architectural Drawing, *Clay Modelling, House Decoration, Constructive Design, House Furnishing.*

We can see that this is decidedly a university Professional School, the courses being arranged for direct application to business, or for teaching, as the Pedagogy, Theory and Practice of Teaching would indicate. If the work of the home-maker and professional housekeeper are identical we have everything here that could be desired. If there is any question about a practical housekeeper being necessarily an ideal home-maker we should perhaps at once discuss the differences. Possibly in other schools less professional we may find courses planned more particularly for home-makers. Upon investigation, however, this proves not to be the case, the courses offered being very similar to those at Columbia.

Without at present defining the scope of a course for home-makers we may assume that a considerable amount of time could be well spent by the home-maker in acquiring a firm foundation through a study of the same Household Arts and Science Courses. Supposing that a girl not needing to make her living, instead of being sent to a regular women's college, goes to Columbia that she may get an education which will fit her to become an all round intelligent supervisor of her home.

The course in Household Administration requires two years, the course in Domestic Art two years, Household Decoration three. Allowing some time for work in nursing, it is likely that she could get, by choosing those courses that would be particularly beneficial to her, a thoroughly scientific preparation for home-making in the four years that she might have spent at college gaining general culture.

But as the number who go to college is so comparatively small and the need for information in these lines greater even for those who never go to college than for those who do we must consider the case of these others also. It is very encouraging to see what excellent courses are being given to teachers who are to go out into the elementary, secondary and normal schools of the country. When we look to see what these are going to teach we see it is: Garment and Dress Making, Millinery, Household Art (Design) and Costume Design, Dietetics, Food Production, Household and Physiological Chemistry and Experimental Cookery. These are obviously decidedly valuable courses for giving the elements of education in Home Economics. Considering again the need, also the comparatively little time there is for these things in the lower schools and noting what courses are thought to be necessary for those who manage institutional or private households in a scientific way, is the present training—incidental in most cases—of the elementary and secondary schools sufficient? People need to know how to live well more than they need to know anything else. If we should plan our schools according to this belief in general, and for girls in particular, we should doubtless find that it would take careful planning to adapt courses to the needs and circumstances of the children who drop out at the various grades up to the education possible for the college woman. This would probably mean that those who drop out first would receive instruction in the most fundamental facts related to self-preservation in its many phases and the scientific management of a home. The college woman would naturally have the greatest opportunity for an all round education in Home Economics and its related topics.

Time for school education being limited as it is, evidently many of those things which we enjoy most in life will be limited to a certain class. Although this is an undemocratic proposition, surely the principles of self-preservation and of earning a livelihood are more urgently needed than the ability to appreciate great Art and Literature. We can only regret the narrowness of a life economically debarred from those pleasures and endeavor to make it the most efficient and happy within its limits. We know that it is impossible for anyone to enjoy work for which he is not prepared. If work is the greatest part of the life of some people, we could hardly do them a greater kindness than making it possible for them to enjoy their work. We think that we know what sort of education produces an all round individual, but it is perfectly clear that present conditions do not permit full development of the personality in the case of every individual.

The government has already done a great deal for free public education and it is merely a matter of time before we have excellently equipped schools for home-makers. In "The Century of the Child" Ellen Key makes a comment which comes up forcibly in this connection. She speaks of the incongruity of so much time and money being spent to prepare for the destruction of life while not a cent and hardly a thought is given to provide for the proper creation of life, referring of course to the burdensome military system of Europe and the lack of system or interest in a preparation for the home and motherhood. With the awakening interest in race deterioration and eugenics, and with practical health, marriage, and labor laws in operation, it may not be long before the states will give more attention to the training of women for their life work than they now give to the preparation of soldiers for warfare. Conditions are very different in the United States and European countries, but doubtless the same comment could be made by Ellen Key in regard to our sense of proportion. Although somewhat of a digression, it is interesting to remark that given the cost of one of our huge battleships and the cost of its maintenance for the twenty years before its final discarding, fourteen thousand young women might take a four years college course in preparation for home-making and motherhood.

But to return to the question of the education of those of college and below college grade, in the subject of Home Economics, it will doubtless be said by many that it is not right to teach women to spend so much time and thought providing food and drink and caring for a house when the pleasures of the mind are so much greater and more eternal. Shall we not rather introduce lower down the possibility of that general culture which college offers, the joy in art and literature, philosophical speculation, and of the knowledge of the evolution of the organic world, man and civilization. If something must be sacrificed why not a little less of the material and more of the spiritual?

To this suggestion we might receive three answers. One from the staunch supporters of the practical study of Home Economics, who, like Ellen Richards, believe that the great advantage of such training is in gaining control of material things which are about us and in making natural and social forces do our bidding in order that we may have time and energy to make life gracious and worth while, and the leisure for the greater pleasures. From those who believe in the higher education of girls as it is now we would have the same argument in regard to spending time disproportionately on material things and in addition the claim that with the broader view and the intellectual power gained through the college training one is prepared in a big, general way for almost any line of work she may choose to take up after college days; and in particular it is not wise or necessary to spend time specializing on those subjects pertaining to the management of a home when one may have some entirely different line of work.

But there is another and more puzzling view to reckon with, one which is held by many farsighted people and in particular by Charlotte Perkins Gilman, who has probably given more time and thought than any other woman in America to the consideration of woman's place in the world and the relation of the home to social evolution and world-wide economics. It is her contention that the processes involved in the management of our present-day homes are extremely wasteful economically—and spiritually—and that sending girls to schools of Domestic Science to prepare them to take care of their own homes according to our present system is only increasing the trouble. Cooking, laundering, sewing should no more be done in the home than shoe making, furniture making or carpet weaving. We want to get these industries, in most cases still crudely and unscientifically done, out into the world, into the hands of co-operative, skilled labor. Then we can have true homes of peace free from the hum of the wheels of industry and the invasion of the stranger whom we allow to be closer to our lives than any friend because she works for us, and free from the constant grinding demand for money to be spent in the uneconomical maintenance of this primitively operated institution.

In reply to the first objection to special education for girls we can say that we are surely tending towards education for life, not only as regards life work as in the case of industrial and commercial training for boys and in some places the high school courses in Domestic Science for girls, but also in the general courses there seems to be an effort to make education more usable in the enjoyment of life. So then, although possibly the tendency of the time is toward specialization as early as the secondary schools we also have the cultural idea in mind and in time may acquire the proper balance, so that there is really no cause for alarm in recommending a more universal education for girls in Home Economics.

Undoubtedly the greatest problem is to be settled for the wage-earning class who may now receive, in many places, education for typewriting, stenography, bookkeeping, etc.

These, naturally, would not ask for more cultural studies but neither would they want to be sidetracked in preparing for a more remote need than the immediate one of making money, of being independent. If these could be assured that there was equal opportunity for positions they could doubtless be persuaded to specialize in Household Arts and Science. The trouble is, of course, that skilled labor is not demanded in those lines to anything like the extent that it is in business, nor does such work have the appeal that the bigger organized work of the world does. But the time is coming for this.

To the objections of the believer in the all sufficiency of the power and grasp attained through general college training we can only say that there seems to be no reason why the same breadth of view and the same power could not be acquired through a broad course in Home Economics, *i.e.*, a combination of Domestic Art and Science and the most humanitarian subjects of the regular college course.

Although the view which Mrs. Gilman holds may not be in accord with our present ideas of home life, we cannot but see in it an opportunity for greater development of the personality because of the more economic disposal of those operations which now take up so much of the life of the majority of women. Moreover, her ideals seem to be in line with the general direction of progress, scientific management, specialization, public service and more leisure for the all-round development of the individual. Biologically, we know that the organization of the highest animals is such that the whole animal is not concerned with the taking in and the digestion of food, though all of its tissues assimilate the food prepared for them by the primary organs of digestion. It is partly a question of the most wieldy size for the unit, and whether we can get as much satisfaction from large corporations as from smaller institutions. Mrs. Gilman claims that we can, though our experience is to the contrary too frequently. It is quite likely that with greater attention to the large, co-operative institutions we might obtain satisfactory results, and in that case it may be that it is wasteful to prepare the majority of women for the administration of households in which these many industries would be carried on. This would mean that instead of being confined within the four walls of the home, occupied with running the machinery of the household, the wife and mother will be free to go abroad and engage in a work adapted to her tastes and ability. With this possibility in view we realize that we have to decide whether after all there are any particular qualifications for a wife and mother. Parenthood is undoubtedly in itself an office of responsibility great enough to require special training though we have not realized it. Since we have assumed that special school training is needed for the home-maker we will have to define the ideal home and home-maker, to be able to say what kind of education is necessary, in spite of the fact that a recent writer on the Education of Women says that "only a quack would presume in our present darkness to prescribe an authoritative course of feminine education."

II. THE IDEAL HOME AND HOME-MAKER

We have already implied that a woman in her home must be more than a mere housekeeper, also that even though this occupation should be taken from her she would still have the peculiar office of parent to fulfill.

That the need for a new woman and a new home is not imaginary, but arises from personal observation of disorderly, uneconomically managed homes, of children unwisely and unsympathetically treated, of unloving wives and husbands, may be shown by the innumerable articles which have appeared in the magazines and papers during the last six or seven years. These articles have dealt with the subject of "Woman Peril" or race suicide through the disinclination of educated women to marry, with the "Failures of American Women" who do not realize their true sphere in life, with the Woman Movement, Woman Suffrage, Bachelors and Maids, Divorce and many other related subjects, all implying or concluding that a reformation is needed in the home and in education for the home. Over thirty years ago Herbert Spencer wrote:

> "The greatest defect in our program of education is entirely overlooked. . . . Though some care is taken to fit the youth of both sexes for society and citizenship, no care whatever is taken to fit them for the position of parents. While it is seen that for the purpose of gaining a livelihood an elaborate preparation is needed, it appears to be that that for the bringing up of children no preparation whatever is needed. . . . Is it that this responsibility is but a remote contingency On the contrary it is sure to devolve on nine out of ten. Is it that the discharge of it is easy? Certainly not; of all functions which the adult has to fulfill, this is the most difficult. Is it that each may be trusted by self-instruction to fit himself or herself, for the office of parent? No, not only is the need for such self-instruction unrecognized but the complexity of the subject renders it the one of all others in which self-instruction is least likely to succeed."

To-day George Elliott Howard, Professor of Political Science and Sociology in the University of Nebraska, discussing America's unique divorce record, the causes of divorce, its dark and bright side, and the ineffectiveness of laws for curing the trouble, says in conclusion:[1]

> "Truly it is needful that the church and the school should join hands in providing a remedy for the social evils that cause divorce. That remedy is not more stringent law but saner education. The salvation of the family depends mainly upon a more efficient moral, social and physical training of the young. The family and its cognate institutions must find a larger place in the educational program. . . . Let us see to it that the new program be broad enough to embrace the whole many sided problem of sex, marriage and the family."

In a recent number of the Progress Magazine, in the Editor's Personal Department, there appeared a rhapsodized version of the whole matter. In spite of its possibly too poetic tone, it appeals to one as containing truth. Real reformers usually believe so warmly in their theories as to think their adoption would mean the salvation of the world. This man has found a new vocation for women, a new field for their labors.

> "A field so vast as to be practically inexhaustible, a field that can promise greater reward and greater satisfaction than almost anything else that woman would care to do and yet it is a field that remains practically untouched.
>
> "This new field is the field of the ideal home and to create an ideal home is the new work suggested for feminine genius. It is a work that requires feminine genius and the greatest feminine genius and the time for such work is now at hand. The new age into which we have entered demands the ideal home and the woman who can create such a home will accomplish far more than if she had written a thousand books or brought the whole world to her feet by the magic and art of her song.
>
> "If you would become truly famous, if you would have your name proclaimed from the housetops, if you would enter the largest most productive field that is open to feminine genius or any genius, and if you would have your work produce greater good and greater happiness to the world than almost anything else you could do, create an ideal home.
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> "There is no field where there is room for so much originality, for so much talent of high order, for so much rich and superior thought, for so much actual and practical ability and for so much of that finer creative power that the feminine mind alone has the privilege to possess.
>
> "If ten thousand women should begin to-day with this object in view—to create an ideal home—and if they all should proceed along original lines taking one or two years for the perfecting of their first creation, can anyone imagine what would happen in the home life of the world during the five years following? . . . There is one thing that we will mention and it is this. These ten thousand women would have placed in action a greater civilizing force than the world has ever seen.

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[1] George Elliott Howard. "Divorce and Public Welfare." *McClure's,* Dec., 1909, p. 242.

"It is the home life that determines the standard and the quality of all the other phases of life. The creator of the ideal home therefore holds within her hand the secret of human destiny. She has the power to make or unmake countless generations to come."

In spite of the possibility of the correctness of Mrs. Gilman's reasoning we will assume for the present that the time has not yet come for the organization of home industries according to her prescription, and our ideal home-maker for the near future will be fashioned upon the old lines. It is not proof of what should be but possibly the reason which caused woman to undertake the agriculture for the home instead of the hunting, *i. e.,* the bearing and rearing of children may still be active in determining the proper division of labor. In connection with the discussion of whether women should have the vote or not, Madam Schumann-Heink states her conviction that no woman can be true to her home and her children if she also has a career. That not even the greater financial ability to provide for them makes up for the more necessary personal relations and care.

If we describe the ideal home-maker which we hope to create through education we shall be better able to account for the curriculum of a school planned to accomplish this end.

We would require for our ideal home-maker the education now offered by schools of Domestic Economics that there may be knowledge of the best way to do things as well as orderliness and system in the management of the home. Besides the knowledge in regard to particular operations and the power of organization, she should have such a broad view of the worth while things of life that this power would lead to a simplifying of life rather than to its complication. She would understand the true economy of time, energy and money. She would not consider it necessary to keep a servant employed at useless tasks for the sake of filling up all her time.

It has been said that men are much more interested in the scientific feeding of their horses and cows than of their children. Whether we find the plan suggested by Mrs. Gilman a workable one or not it will probably be a long time before it will be unnecessary for the mother of a family to understand the principles of dietetics and physiology. Even if she takes no part in the preparation of foods it is hardly likely that the persons to whom this work is entrusted will understand the necessity for a balanced ration; or if the work were in the hands of experts, she would still need to dictate as to what was needed by the members of her household—for no one else could be expected to have the same emotional interest in her children and husband. Through an intelligent understanding and application of the principles of dietetics alone she could render an inestimable service to her own family and the community at large. No amount of mental discipline or physical education can make unnecessary the having of plain nourishing food in the normal development of the individual.

> "Vitality is fundamental. Without good health we cannot expect the highest mental development. Without good health and the vital conditions which produce it, we cannot expect a high morality. Without good health and the sense of well being which accompanies it, we cannot expect a deep sense of sociality or social sympathy.
>
> "We have come now to see the fact that sociality rests upon morality, that morality is a differentiated form of mental life and mental life is conditioned upon physical life while efficient physical life depends primarily upon the food we eat."[2]

If as Laura Clarke Lockwood points out, the physiological chemists prove that the individual requires for full vital development food of certain quality and quantity to produce 2,500 to 3,000 calories of energy per day and that individual in his home through the ignorance of those who prepare and serve the food consumes a greater or less amount of innutritious food, just to that extent is the home responsible for the weakening of the vital power of the individual and the social personality.

The same writer estimates statistically that of the total number of deaths in the State of Iowa during August, 1910, 1/5 were children under one year. 80% of these were due to a disease largely preventable through hygienic means—cholera infantum. Other investigations appear to show that colds and sore throats can be controlled by diet.

We find however that nothing is sufficient in itself. At the Mental Hygiene Conference held in Boston, March and April, 1913, it was said that not even excellently prepared food would nourish a man if his surroundings, table companions, the wall paper or china were uncongenial to him. A woman who had studied in a school of Domestic Science would undoubtedly be appreciative of this fact instinctively, and possibly aside from her love of beauty and harmony would understand the psychological value of a pleasing environment both indoors and out. The psychologist tells us that we inevitably respond to our environment so as to reproduce it in some way again, and that we are subtly influenced by imperceptible lines, angles, and shadows. To say nothing of the depressing effect upon our spirits of bad art in the matter of house furnishings and costume, we become either dull to such things or come to have erroneous ideas of true beauty as a result of having continually before us violations of the principles of truth in line and color. Our final judgments and philosophy are the result of our total experiences in all lines.

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[2] Laura Clarke Lockwood. "Food Preparation and Its Relation to the Development of Efficient Personality in the Home." *Pop. Sci. Mo.*, Sept., 1911, p. 277.

The poet makes us realize the quiet influence of environment on the plastic nature of a child.[3]

" There was a child who went forth every day
And the first object he looked upon, that object he became:
And that object became part of him for the day: or a certain
part of the day or for many years, or stretching cycles
of years.
The early lilacs became part of this child
And grass and white and red morning glories and white and
red clover and the song of the phoebe bird.

* * * * * * *

"And the apple trees covered with blossoms and the fruit
afterward and woodberries and the commonest weeds
by the road."

Owing to the comparatively recent interest in the subject of child study, physical education, the matter of eugenics, and the new ideas in regard to ethical marriage put in circulation by the Scandinavian writer, Ellen Key, a new responsibility devolves upon the woman who will marry.

As soon as life begins physical education should begin, and with the development of reason an appreciation of the duty of the individual to maintain as high a standard of physical efficiency as possible. After realizing that the psychical has its basis in the physical, that clear sightedness, fairness, reasonableness, attractive magnetic personality are in a very great measure due to good health, a woman should study her own physical nature to know the extent of her possibilities so that she may be reasonable in her undertakings. She must regulate or eliminate those activities which are not conducive to health in her case. Aside from matters of food, bathing, the proper balance between work, rest and play, she should understand the limit to her obligations to society, to her giving of herself to husband and children and the duty of non-conformance to convention when it interferes with the highest physical life. Undoubtedly the person radiating good health and the joy of life is a greater inspiration to her family and society than one who gives unreasonably of herself, sacrificing health and spirit in the process. We observe this frequently in the case of loving mothers and conscientious self-sacrificing teachers who wear themselves out doing for others and then lose their influence. Too often it is a case of casting pearls before swine. Though we cannot get away from the necessity of sacrifice there seems to be room for more intelligent discrimination in what is really necessary.

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[3] Walt Whitman. "Leaves of Grass," p. 234.

A far-sighted woman will realize sooner or later that she owes it not to contemporary society alone to be healthy, but to posterity. Her children have a right to be well born or to be unborn. She will choose a comrade primarily because of love, but she will understand the necessity of looking to health and character for the sake of the unborn. Knowledge of the general laws of health for herself and children would be incomplete without an understanding of the development of the child before birth and the best mode of life for the mother in order that its life may be all it should be.

If, as Ellen Key says, no children are well or legitimately born who are not the children of love, the whole subject of love and marriage will need to be philosophically gone over for the sake of the child, to say nothing of the happiness of its parents. There will be a more earnest endeavor to understand the ethical relation of this union and of the duties of parents to children and of children to parents, of wives to husbands and vice versa, and coincident with this a broader sympathy for all members of society and a respect for their rights and personalities.

Although much is said about eugenics and the importance of birth it is only one factor in the creation of a perfect personality. It is conceded even by the eugenist that the nurture of a child is fully as important as good birth. Educators here and there for many years have endeavored to make people see the need of educating very little children carefully. To-day the majority of educators are alive to this necessity and we frequently hear it emphatically stated that it is more important that primary teachers should be persons of unusual pedagogical ability and personality than the teachers in the higher grades. Consequently we require the more particular training for Kindergarten teachers whereas many college students go directly from their studies to teach in high schools and colleges without any special instruction or practice in teaching.

If we require this careful training in the case of school teachers, is there not something to be required of the mothers of children who have the education and influencing of them during the six most plastic years of life? The need for this education is becoming so clearly recognized that parents' clubs and associations are being formed in many parts of the United States, England and the Continent.

The Congrès Internationale d'Education Familiale already referred to is a world-wide association purely for the study of problems in home education. At the Third Conference of this Association held in Brussels in 1910 under the sections dealing with infancy, with family education before the school age, during the school age and afterward, such topics as the following were discussed: Study of Characteristic Faults and Tendencies of Children, The Value of Child Study by Parents' Associations, Causes of Crime in Normal Children, Justice in the Home, the Child's Natural Aptitudes and their Development with the view to choosing a career, Religious Education through the Organization of the Home, Arrangement of a Child's Room, considered from an educational point of view, Development of Initiative and Responsibility in Children, Unavoidable Short-Comings in School Education, and how to remedy them in the home. These are questions in which every intelligent mother should be deeply interested.

In an article in the report of this Congress, entitled "The Causes of Crime in Normal Children," Mrs. Frederick Schoff of Philadelphia presents a strong argument for the education of parents. Mrs. Schoff was at that time President of the *Phila. Juvenile Court and Probation Association,* a member of the *American Committee for the Congress on Home Education* and president of the *National Congress of Mothers* and of the *Parents-Teachers Association.*

> "As an earnest student of child life for many years, as one who through the rearing of a family of sons and daughters has learned much of child life, as one who for twelve years has given the closest thought and study to conditions of childhood, in home and school and nation each year has deepened the sense that the world must awaken to the fact that it is the ignorant and unscientific and injurious treatment of children that causes disease and crime."

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> "The lack of wise sympathetic care and training by parents is the principal cause of juvenile delinquency.
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> "Good parental care is the first requisite for prevention of criminality. Parents who may be very good people have absolutely no knowledge of the science of child nurture. They are not intelligent in developing the physical or moral nature. They fail through lack of knowledge quite as often as through neglect. The misdirection of boys is much greater than that of girls. Parents do not prepare them to meet the temptations they encounter. The home is not made attractive. The desire for activity and excitement is repressed and not met by providing a safe outlet during the adolescent age."

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> "The science of child nurture must be taught to parents. They are not to blame for their ignorance for there is no provision for the acquirement of such knowledge. It is more important that education for parents concerning child development and care should be

made compulsory than to make it compulsory for children to go to school. The terrible mortality of infants shows this parental education alone can save babies' lives. It is essential in prevention of crime."

This argument is for the moral side of the question and is also a negative suggestion, dealing with the prevention of an evil rather than with the production of good. As arguments on the positive side, and striking rather because of mental than moral attainments, we have the experiments in child education carried on by the father of Carl Witte, Professor Sidis of Harvard, Dr. Berle of Tufts and others. In his recent book, The School in The Home, Dr. Berle shows by convincing reasoning and illustration that early childhood is the time for acquiring mastery of correct English, which is the tool of knowledge; it is also the time for mind culture, fertilization, for the inculcation of the most profound truths, for mental self-organization, for the breeding of intellectual ambition, the implanting of moral ideals and for learning to appreciate the pleasures of the mind.

In relation to the formation of good mental habits he says: "Clearly this is a parental question. It cannot be left until the period called 'school age' as though this age came automatically according to some heavenly arranged arithmetical succession. By the time what is called school age arrives, the damage has usually been done. The habits while not utterly deranged, have been deformed by ill usage and the very mind stuff itself corrupted by the infusion of all kinds of superstition, puerility and falsehood, so that only the most persistent effort on the part of everybody concerned—parent, teacher and the whole organization of church and state and home—can scarcely bring order out of the chaos which the early sterilization of the mind has produced."

Whether these intellectual experiments are going to prove truly successful and whether all children shall be educated in a like manner does not matter so much here. If degrees and distinctions count for anything we can believe these children have a good mental equipment. We surely cannot deny that vast possibilities are here revealed. We have practically gotten our hands upon the most vital point in the development of the individual. It remains for us to prepare to use this knowledge for realizing our ideal for the individual and for society. This preparation must be definitely directed to the end, not casual or incidental.

"Nor will the necessity for effective training on the part of parents ever cease, if the home is to fulfill its function. As in other professions of life there will always be the need of scientific preparation and subsequent growth in wisdom and inspiration."[4]

Nor does this education for the home and the bringing up of children preclude other social service. Great philanthropies have usually been the outgrowth of the same instinct which underlies intelligent sympathetic parenthood. After the children are grown it would be only natural for a woman to turn her experience to account in educational activities outside the home.

> "The maternal instinct marvellously qualifies woman to offer the tiniest human being her whole love, to preserve and protect it with the sacrifice of her life. The spiritualization of this instinct means that such love shall become ever richer and freer. It means that she shall mother not only her own children but all children.
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> It is a woman's right to see that potential humanity shall not fail to realize all the possibilities for lack of mother's love and that woman's power shall not decay because it is not spent in blessing mankind."[5]

When woman can become her highest self through educational opportunities she may more rightfully be the adored which she has always been with cautious reservations. For living in harmony with the laws of nature, using all knowledge as a revelation to more perfect life, and having a mind ever open to new revelations she would truly become more divine.

Does not Walt Whitman have in mind such a woman?

"Unfolded out of the folds of the woman man comes unfolded and is always to come unfolded.
Unfolded only out of the superbest woman of the earth is to come the superbest man of the earth.
Unfolded only out of the friendliest woman is to come the friendliest man.
Unfolded only out of the perfect body of a woman can a man be formed of perfect body.

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Unfolded out of the justice of the woman is all justice unfolded.
Unfolded out of the sympathy of the woman is all sympathy.
A man is a great thing upon the earth and through eternity, but every jot of the greatness of man is unfolded out of woman.
First the man is shaped in the woman, he can then be shaped in himself."

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[4] Fannie Fern Andrews. *l'Union de l'ecole et de la famille.* Boston.

[5] Geo. Burman Foster, "The Woman Movement." *Progress Magazine,* Feb., 1911.

III. THE IDEAL SCHOOL FOR HOME-MAKERS

The School is situated in the country to the northeast of the town of —— from which it may be reached by a fifteen minute walk beyond the borough limits, by electrics running every half hour, or by train to the little station of Oakland. The founders were most fortunate in being given by the will of the owner the opportunity to purchase at a very low sum an estate in excellent condition belonging to this gentleman, who, beside being philanthropically inclined, was much interested in landscape gardening and the preservation of the natural beauties of his six hundred acres. Much of the original beauty of the land remains; its native woodland, stony brooks, and broad meadows. Three little lakes afford opportunity for swimming, boating and skating. Beautiful sunken gardens, where blooms a continuous succession of flowers from early spring to late autumn, water gardens with lilies and gold fish, unexpected little fairy glens, and old gray vine-covered walls proclaim the unrivalled skill of an English architect.

During the spring and summer the vegetable gardens scientifically laid out and cultivated by the students of the nearby Agricultural College and the experiment gardens of the students are objects of interest to the visitor. The large athletic field and tennis courts are placed in such a way as to be inconspicuous. Special effort has been made to prevent the school from having an institutional appearance in any respect. It might be considered rather as a country community or little village with not too widely separated cottages, the styles of architecture varying in details, but model little houses built with a view to real economy, perfect lighting, heating, sanitation and beauty. The old manor house was admirably adapted to the needs of a school building after some alterations. Here are the laboratories, shops, lecture rooms, a gymnasium, an auditorium, library and a model Kindergarten and school room for the children.

One of the most interesting features of the school is found in the pretty little cottages scattered here and there in which live, not students learning to be home-makers, but children ranging in age from one year and under to fifteen years. At the time of the founding of the school, one of the originators conceived the idea of inducing the managers of a certain (rather badly managed) asylum in a nearby city to sell out and bring the children to the country in order that they might be living a more wholesome life and at the same time be furnishing an opportunity to the students for working practically as well as theoretically with children. There is a special pamphlet describing the life and activities of the children and the possibilities for their future usefulness. It is enough to say here that the school work of the younger children, the games and plays of all of them, and the management of their homes and home life with respect to food, clothing and personal habits and house duties are largely in charge of the students under excellent supervision.

The aim of the school is primarily to educate woman for the home, to give her not "the higher education" as Mr. C. W. Saleeby says, but "the highest education." It is also an excellent preparatory school for more specialized schools of Domestic Art and Science if a student desires to follow out some particular line of work in which she may have become interested here. It is expected that a young woman will gain a reasonably large number of useful, definite facts as a present and future working basis for her work as a home-maker, a knowledge of the best methods of work, an appreciation of the universal principles underlying all phases of life, society, and the biological, physical and psychical world, a vision of the meaning of abundant health, and deep abiding intellectual interests and loves. Incidentally the school is as a Bureau of Information to the citizens of the nearby town. To these it furnishes the latest news on the subjects most concerning home-makers, *i.e.,* nutritional questions, household furnishings and appliances and movements in regard to the education of children, etc. The books and magazines in the Library are at their service in the building; it is hoped in time that the library may be entirely free to those wishing to draw out books. Members of the faculty and senior class speak frequently at the various mothers' clubs in the town. The townspeople are cordially invited to lectures by outsiders given at the school.

Entrance Requirements

The number of students at the present time is limited to two hundred and fifty so that great care has to be exercised in receiving students. The qualifications of all desiring to come are considered, and all things else being equal, those who are natives of the town or county are first admitted except in rare cases.

Blanks will be sent to applicants to be filled out by the principal of the last school attended and by the family physician. An applicant must be at least seventeen years of age.

Although it is most important that a student shall have done work of a high grade before applying for this school, character and good health will be considered above any other qualifications. Before the final acceptance there shall be a personal conference with the principal, a physical and mental test and a written examination of the applicant's ability to use good English.

Because a student is once admitted it does not mean that her place is assured for the whole course of four years. A student who shows herself truly interested and in earnest and in sympathy with the aims of the school will in all probability receive an invitation to return after each year's work.

It is a theory of the school that burdening the mind with a great number of unrelated, unessential facts is as injurious to one's healthful mental life as unnecessary food is detrimental to the physical life. It very often happens that a specialist in his particular line has become so interested in the finer points of his subject and lost to the relation of the subject as a whole to life that he fails to distinguish between what is of value to the pupil who cannot specialize and the points which are of especial interest to him. Before the beginning of the school year much time is spent by each instructor in planning and correlating his work with that of every other offering work to students of the same class. For this purpose a brief convention is made necessary but it is hoped by this means it will be possible to eliminate the unnecessary to such an extent that the mind of the student may be kept in good tonic condition and fresh to attack every problem as it presents itself in the laboratory or class room. First and last it is health that is desired. "A sound, accomplished, beautiful body, a sympathetic, intelligent mind, a reverent spirit; this is education."[6]

Religious Life of the School

A word should be said in regard to the religious life of the school. It is not a denominational institution, nor is there any attempt to teach any doctrine or religion save that of reverence for a Higher Power, justice, conscientiousness, happiness, kindliness and good fellowship. At the beginning of the morning session there is singing and reading selected for its inspiration to the highest moral and spiritual life. To live the highest and best life according to his knowledge is the duty of everyone and the ways and means should not be questioned. It is held to be of greater importance to live a convincing life than to preach the best of sermons. Students may attend and are encouraged to attend the churches in town where they may come in contact with normal actual life. For those who desire it there are the regular so-called communion services held every Sunday morning at the school, social, friendly conferences in which all have a part and no one is the particular speaker. In the evening there are group gatherings in the cottages for singing or reading—not compulsory. Occasionally great men and women address the school, at other times there is music and singing for which the students may invite their friends.

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[6] Organic School of Education, New Hope, Alabama.

The question "What is to be the religious education of children?" throwing aside all preconceived ideas or current practices is one to make the young people thoughtful and interested.

The Social Life

The social life of the school cannot be said to be a thing apart from the work—working together and playing together is in itself a great social opportunity. But there are times for doing things a little out of the usual routine and for giving other people pleasure. There are children's festivals, boating parties, tennis tournaments, walking and camping parties and picnics to which the girls may invite their friends away from the school—both girls and boys. There is the singing at the hospitals and Old Peoples' Homes on Christmas and May mornings, the Reading Recitals and Musical Entertainments. But though there are these many things to be done they do not occur so frequently as to interfere with the work, and the situation of the school, its natural beauties and the education of the girls makes entertaining comparatively simple. It is merely a matter of sharing the advantages of the school with others.

The Curriculum

The courses offered are as follows, alphabetically given, not in order of importance:

1, Art; 2, Biology; 3, Chemistry; 4, Clothing and Textiles; 5, (Education); 6, English; 7, Gardening; 8, Household Management; 9, History; 10, House Planning; 11, Kindergarten; 12, Literature; 13, Mathematics; 14, Music; 15, Nursing; 16, Philosophy; 17, Phys. Educ.; 18, Physics.

Art.—I. An elementary course in drawing and color work with simple nature objects, fruits, leaves, flowers, etc., for studies. Practice in producing effective landscape sketches in color by simple means. Rapid no-detail sketching with lines to illustrate stories of action for children: Designing of cards for seasons, days, special occasions. One hour a week for a year.

II. Elementary work in carpentry, basketry, brass, clay modelling, stencilling, embroidery and paper construction. The year will be divided so that a certain amount of time will be devoted to each subject and in the latter part of the year opportunity will be given for each student to devote the regular laboratory time to that branch of the work which most interests her.

III. History and Appreciation of Art.

The first half year will be devoted to a birdseye view of Plastic and Pictorial Art and its development from the time of the Greeks until the present time, the students marking for further study those pieces which, in their opinion, have an aesthetic value independent of their value historically in the evolution of Art. The lives of the greatest artists will be noted but studied in detail in connection with the biographical course under History. The latter part of the year will be occupied with a study of great pictures and statuary of the past and present, with reading and discussion of the most interesting pieces of literature inspired by them or by which they were inspired.

IV. The final course in the department of Art consists of a theoretical and practical part. The theoretical will deal with the psychology of Art in its application in line, form, proportion, color, respectively and in combination. There will be opportunity for observation and criticism of the application of these principles in the work of experts in House Decoration and Costume Design. Some time will be spent in consideration of pictures suitable for the different rooms of the house and the place and value of plastic Art in the home. The laboratory part of the course will be the practical application of these artistic principles in combination with those of hygiene and economy to house furnishing and decoration. Styles of furniture, carpets, hangings, wall papers, picture framing will be tested out and experimented with to determine their proper combinations and suitability for various rooms. China and linen will be studied from this view point, the aim of the course being to call the attention of the students to artistic, inexpensive effects which may be obtained and to emphasize the uselessness of bric-a-brac and ornaments not necessarily lacking in beauty themselves, but too often unappreciated in their surroundings and more often an unnecessary burden to the caretaker.

Biology—I. General biology, a nature study course designed to arouse a genuine love of stars, trees, flowers, plants, animals and birds. Not in any respect a laboratory course but an outdoor study of the seasons and what they bring, the trees in spring, summer, autumn, winter, the birds and animals, their habits and relation to the environment, the insects and the good and harm they do. Thoreau and other nature writers and poets will be studied in this connection partly in this department and partly in the Literature department. Outdoor expeditions will be taken throughout the year but during the winter months, when the weather is too inclement for walks, by means of lectures and pictures there will be a brief review of the plant and animal kingdoms with some attention to distribution and evolution.

II. Anatomy and Histology: The first half year will be given to the laboratory study of the anatomy of the Cat with frequent references to human anatomy. During the second half year the histology of the different tissues and organs will be studied.

III. Physiology and Hygiene: Physiology is given in the first half year; this course deals with circulation, digestion, excretion, respiration, the normal activities of the nervous system and special sense organs and muscular action. Hygiene is given in the second half year, personal hygiene of exercise, fatigue, rest, common preventable diseases, care of the eyes, ears and feet, bathing and clothing. Problems of public and domestic sanitation, ventilation and the spread of disease will be discussed.

IV. The first two terms of the year, the anatomy of the reproductive organs and the physiology of reproduction is studied, prefaced by a brief study of the means of reproduction in plants and animals. Especial attention will be given to the influence of the general health, nutrition, exercise, rest of the mother previous to the birth of the child and during the period of lactation. During the last term theories in regard to sex determination, principles of heredity and general eugenic problems will be discussed.

V. A course in the anatomical, physiological, psychological development of the child from birth until adolescence with particular consideration of the kind of food, mental stimuli, the proper balance of rest and exercise and the interests best calculated to develop an efficient, happy, lovable personality. There will be practice in the use of the Binet Test. Especial emphasis will be placed upon the care and feeding of the child in the first three years of life and upon the necessity in later years of guarding against the deforming influences of long periods of school work and faulty attitudes during school hours. The moral and social nature will be studied. To supplement this work there is the practical work with the children and the study of child nature through literature.

Chemistry—I. An elementary course in chemistry dealing with every day practical problems such as are met with in cooking, cleaning of metals and woods, food adulteration and preservation, dyes and their effect upon dress materials, etc.
II. A course in physiological chemistry preparatory to the study of Physiology and Dietetics.

Clothing—I. A course for the discussion of the real values of clothing, aesthetic, hygienic, economic, and the durability of different materials. The significance of the frequent changes of fashion.
II. Simple sewing for teaching the stitches and the use of a sewing machine, mending, darning, patching, making of underwear.
III. Dress-making—design and execution of dresses. The girls make their athletic costumes and gymnasium dresses.

Cooking—I. To give introduction to the simple operations in cooking and acquaintance with kinds of apparatus. Plain cooking, management of fires, care of cooking utensils, relative values of different kinds of utensils, experimentation with gas, electricity, hard and soft coal, fireless cookers, to determine economy and most satisfactory results. Refrigerators and thermos vessels.
II. Dietetics. Study of the composition of foods, their physiological value and proper combination. Dietaries best adapted for individuals in various occupations and the feeding of infants and children.
III. Advanced Cookery. A continuation of course I and in addition cake baking, fancy cookery, preservation of fruit and vegetables.
IV. Course in marketing—what and how and when to buy. Discussion of production, sources of supply, preparation and means of transportation.
V. Preparation of menus and meals for the children and students.

English—There is no course in English composition. The talks and papers given by the students in the different departments will be the practical work. Emphasis will be put upon clear, logical, accurate expression, oral and written, in all courses. There are English readers or censors whose work it is to read papers and confer with the students in regard to their work.

Gardening—I. Practical gardening—flowers and vegetables —a course designed for those who may have the opportunity of having a small garden in town or city—it is not intended for gardening on a large scale. Discussion of the best methods and times of planting seeds, flower and vegetable, of the way to have a continuous succession of bloom in the garden. Hot beds, window boxes, care of flowers indoors. Suggestions for beautifying the home, its yard or garden, the town or city streets.

History—I. Universal History. The object of this course in history is to give the students a big idea of the development of man from the earliest known condition to his present state of development, his struggle for existence, his growth in knowledge and power of mastering his environment, the evolution of the home, the development of co-operation and ethical ideals, woman's place in the family and in the state. The rise and fall of nations, reasons for eminence, cause of downfall; big movements, crusades, migrations, wars. The life of the people at different periods and the philosophy of history, the lesson of past events for present action rather than the remembering of long lines of kings or rulers and the manoeuvers of military captains.

The students have large note-books containing the outlines of history, the periods and dates, political and military events of significance—these are to be filled in with the data of especial interest to them as students of the development of the individual and of social customs and institutions or in connection with the Arts and Sciences and Literature.

II. A course in biography in which the lives of great men and women of all times are studied to discover their powers and characteristics and in what relation they stood to their time. Much practice will be given in presenting the stories of heroes and great men in an attractive form to children.

III. Present day current events, social, economic and political problems, philanthropies, missions. Instructors will address the school at the beginning of the morning session on topics of current interest. The seniors will take this responsibility, with help and advice, during the last half year.

House-planning—I. Lectures on house-planning considering purpose, convenience, beauty, hygiene, economy. Evolution of the house and reasons for different styles of architecture. Review of standard American and English styles of architecture and discussion of suitability for use in various localities.

II. Observation and criticism of cottages, bungalows and houses—drawing of plans of interiors, method of procedure and points to consider.

Household management—I. Distribution of income, economy. Planning work of the household, care of the various rooms.

Family pleasures and outings.

Kindergarten (Education)—I. Study of theory of Kindergarten, Montessori school, Berle and Sidis on early education of children.

II. History of Education.

III. Study of gifts, occupations, games and dances.

IV. Practical work in children's Kindergarten and in children's cottages.

The courses in art, nature study, drawing and painting and construction work, literature, are adapted for use in this department.

Practical Laundering—I. Methods of Laundry work—practice in washing and ironing different articles of clothing. Consideration of soap, water, washing machines, mangling, electric and gasoline irons.

Literature—I. Study of great pieces of Literature from Bible, poetry, fiction, drama.

II. Study of Literature adapted to children. Psychological basis of the suitability of certain books for particular ages or stages of development in satisfying needs of the mind at the time and creating ideals for action. Preparation of book lists. Collection of poems and songs, national, seasonal, festival, nursery rhymes and tales. Dramatization of stories and poems for children to act.

III. Reading or Elocution. Interpretative reading, memorizing of poetry, story telling, dramatics.

Mathematics—I. Practical arithmetic—method of keeping accounts. Simple geometrical principles as they are found to apply in any of the work. Business methods and customs.

Music—I. Vocal—practice in reading music.

II. Piano—lessons will be given upon request if a student is able to take the work.

III. Chorus singing.

Nursing—A course in training for care of the sick at home, emergencies, bandaging, antidotes, symptomatology, diet.

Philosophy—I. Elementary psychology—analysis of sensations—study of mental processes.

II. Ethics: Relations of individuals to one another, family relations, individual's duty to society.

III. Analysis of psychological nature of man, woman, child, as based on anthropological differences and peculiarities.

Characteristics of different races and peculiarities due to climatic conditions.

IV. Philosophy of Religion: Types of Religion of different periods and countries. The Christian Religion—its ethical nature. Religious education of children.

Physical Education—I. Formal Swedish gymnastics and corrective work.

II. Athletics: Hockey, Basket Ball, Tennis, etc., Swimming.

IV. Dancing: Folk dances and aesthetic dancing.

V. Practice in planning walking and camping expeditions.

III. A course in the theory of corrective gymnastics, observation in the children's clinic to impress upon the minds of the students the importance of the utmost care of children in the periods of growth.

A Bibliography of General References

Books.

Berle, A. A. The School in the Home. Moffat, Yard & Co., N. Y., 1912.
Gilman, C. P. Women and Economics. Small, Maynard & Co. Boston, 1898.
—— ——. The Home. Charlton Co. New York, 1903.
Key, Ellen. The Century of the Child. Putnam. New York, 1909.
Saleeby, C. W. Parenthood and Race Culture. Moffat, Yard & Co. New York, 1909.
Report of the Third International Congress on Domestic Education. Brussels, 1910.

Magazines.

Good Housekeeping, 1910-11.
Journal of Home Economics, 1909.
Outlook, 1909.
Progress Magazine, 1911.

EUGENICS

By A. E. Hamilton

Introduction: Historical

The bubbling over of Eugenics from laboratory and learned society into the public press has left many of us inquiring, with Rabbi Ben Ezra—"We all surmise, they this thing and I that: whom shall my soul believe?" Chestertonian marriage by the police, Schopenhaurian sterilization of all scoundrels, Nietzschean breeding of supermen to run the human race, and even the popular baby-show are regarded as near of kin to what Conklin calls this "infant industry."

Eugenics has been epitomized by Chamberlain (6), Field (25), and others, while Davenport (13), Kellicott (48) and Schuster (86) have presented the subject in greater detail. The volume of literature claiming to be eugenic grows daily larger and it is the purpose of this paper to review a part of it. Pre-Galtonian writings of eugenic flavor, such as the Bible with its record of the first wholesale elimination of the unfit in the story of Noah; Plato's Republic advocating a lethal chamber to take the place of Lycurgan rocks; Aristotle's prenatal speculations; the song of Theognis of Megara; Campanella's utopian city of Platonic pattern; ante-nuptial inspections as pictured by Sir Thomas Moore; Malthusian concern for the feeding of the species—all these must be passed by with a mere mention.

The present eugenics movement sprang from the great mutation in thought initiated by Darwin's "The Origin of Species" in 1859 and had its specific starting point in two articles by Francis Galton in *MacMillan's Magazine,* June and August, 1865. Their thesis, that better men could be bred by conscious selection, was continued in "Hereditary Genius" (29) published in 1869.

This was an elaborate and painstaking study of the biographies of 977 men who would rank, according to Galton's estimate, as about 1 in 4,000 of the general population in respect to achievement. The number of families found containing more than one eminent man was 300, divided as follows: Judges 85, Statesmen 39, Commanders 27, Literary 33, Scientific 43, Poets 20, Artists 28, Divines 25. The strong constellations of interrelated eminence led to the conclusion that heredity played a very important part in achievement and suggested that by selecting from strains that bore eminence, a superior human stock could be bred.

The attention given to Galton's ideas by Sir Charles Lyell in his "Geographical Evidences of the Antiquity of Man" and the welcome they received in Darwin's "The Descent of Man" stimulated eugenic thought and encouraged its leader to continue his work. He questioned 180 eminent scientists relative to their education, inheritance and relationships, and from the data obtained built "English Men of Science: Their Nature and Nurture" (30) which re-emphasized his contention that heredity played the greater rôle in achievement. In 1883 came Galton's "Inquiries into the Human Faculty and Its Development" (31), a set of evolutionary and anthropometric essays where the word Eugenics was first used in a new exposition of the author's views. "Natural Inheritance" (32) appeared in 1889, being the cream of various memoirs published since "Hereditary Genius," dealing with the general biological principles underlying the study of heredity and continuing the study of resemblances between individuals in respect to stature, eye color, artistic faculty and morbid conditions.

Galton watched the slow spread of his idea quietly until the year 1901, when he defended "The Possible Improvement of the Human Breed under Existing Conditions of Law and Sentiment" (33) before the *Anthropological Society*. Three years later he read a paper entitled "Eugenics; its Definition, Scope and Aims" (34), to the *Sociological Society*. His program, in brief, was as follows:

1. Disseminate knowledge of hereditary laws as far as surely known and promote their further study.
2. Inquire into birth rates of various strata of society (classified according to civic usefulness) in ancient and modern nations.
3. Collect reliable data showing how large and thriving families have most frequently originated.
4. Study the influences affecting marriage.
5. Persistently set forth the national importance of Eugenics.

The year following, Galton again read before the Society (35), suggesting the award of certificates of quality to the eugenically fit. He also maintained that marriage customs which are largely controlled by public opinion could be modified for racial welfare through a moulding of public sentiment.

William McDougal next focused the attention of the Society on Eugenics when, in 1906, he made "A Practicable Eugenic Suggestion" (54) in the form of an "Endeavor to introduce the custom of remunerating the services of every person belonging to a selected class (of the racially fit) . . . according to a sliding scale such that his income would be larger in proportion to the number of his living offspring." He wished the State would take the initiative so that corporations and philanthropies would follow suit if the measure proved effective. No satisfactory answer, however, was found to Benjamin Kidd's inquiry as to what constituted the measure of breeding fitness in the intellectually superior.

Two years previous to the reading of McDougal's paper Galton had founded a Research Fellowship at the University of London to determine, if possible, what the standard of fitness was, and in 1905 a Scholarship was added. Mr. Edgar Schuster and Miss E. M. Elderton held these posts until 1907, when Professor Karl Pearson took charge of the research work and, at the resignation of Mr. Schuster, Dr. David Heron was appointed Fellow. On Galton's death, January 17, 1911, it became known that through the terms of his will a Professorship was founded and Professor Pearson invited to hold it. This corps of workers constitutes the Eugenics Laboratory staff, whose purpose is pure research. The product of the laboratory is embodied mainly in two series of publications, Memoirs and Lectures supplemented by Studies in National Deterioration published by the Department of Applied Mathematics of University College. Most of the important studies have appeared in Biometrica, first issued in 1901. The hearty co-operation of physicians all over the United Kingdom has been secured and it is hoped that the Galton laboratory may become an effective clearing house for all authenticated material on human heredity that may come to light in the fields of pathology and normality. In 1901, Professor Pearson (73) delivered a lecture on national stability as related to heredity which attracted wide attention owing to its timeliness, coming as it did when England was appalled at her losses in the South African war, to which she had sent much of her best breeding stock.

A notable discussion of the strictly hereditary aspects of Eugenics took place before the *Royal Society of Medicine* (8) in 1908, when Professors Pearson and Bateson upheld respectively the biometrician and mendelian methods of approach to the problem of inheritance. It is regrettable that the controversy between the two schools has not by this time dwindled to negligible proportions, since they represent the obverse and reverse of the same labor to a common end. Perhaps the day will come when the biometrician, dealing with mass values in the way he is peculiarly fitted by training to do, will be ready to receive, classify, analyze and correlate the data gathered by the mendelian in his intensive study of individual phenomena. At the same time, the biologist must be called upon to give adequate proof that his data are sound and thoroughly tested before they shall be so used.

To spread such knowledge of Eugenics as might be gathered by specialists, the *Eugenics Education Society* was formed in 1908 with Francis Galton as honorary president and a council of forty to direct its policy. Its official organ is the *Eugenics Review,* in which papers read before the society and a digest of all matters of eugenic import appear. Branches of the Society have been formed in Belfast, Birmingham, Glasgow, Haslemere, Liverpool, Manchester, five in New Zealand and one in Australia. There is a large membership also in the United States. The scope of interest comprises: (a) Biology in so far as it concerns hereditary selection, (b) Anthropology as related to race and marriage, (c) Politics, where it bears on parenthood in relation to civic worth, (d) Ethics in so far as it promotes ideals that lead to the improvement of social quality, (e) Religion, in so far as it strengthens and sanctifies eugenic duty. In "Essays in Eugenics," 1909, (36) Galton again set forth his aims, endeavoring to put in a simple way the principles underlying biometrical studies. He suggested that someone continue this work as he thought that without at least a general concept of mathematical methods as applied to the study of heredity the public would not appreciate the results of much important research. Miss Elderton (17) and Mr. Schuster (86) have done this.

Constable (10) built a book refuting Galton's "Hereditary Genius" and contending that the clustering of eminence around a specific nucleus for two or three generations forward and back is but the crest of a wave on the surface of the race, a manifestation of the reserve energy possessed in even distribution by humanity as a whole and not limited to a certain strain or breed. Intellectual improvement of mankind is possible, but only through utilizing powers now at hand, ready to be used when opportunity shall be given to all alike. He seems to have overlooked the fact that Galton takes practically this same view and, in regard to Eugenics, says (37, p. 311): "What I desire is that the importance of eugenic marriages should be reckoned with at its just value, neither too high nor too low, and that Eugenics should form one of the many considerations by which marriages are promoted or hindered, as they are by social position, adequate fortune, and similarity of creed."

Lester Ward (93) attracted much attention to Eugenics through his vigorous opposition to Galton's idea of the supremacy of nature over nurture. Hobhouse (42) sees a mutually cancellatory process in variation of good and bad and believes progress to be more dependent on the survival of the good than on the elimination of the weak. He sees in the writings of Eugenists no inductive basis for assuming race deterioration and argues that, " It is not human quality whether original or acquired that differs profoundly from period to period. It is the turn given to human quality by social structure." He points out that Spencer's law of the inverse ratio of fertility and development is no new thing, and that the race probably always will recruit itself from what are termed the lower strata of society. Not lack of parental instinct, but consideration for wife and child, he holds to be at the root of so called race suicide, and believes education will in due course keep the race from the extremes of birth limitation. Nearing (61), from the sociological side, is optimistic regarding the decline of the birth rate in civilized countries, saying that, "An equilibrium of population has been established through the saving grace of the decrease in birth rate commonly called ' race suicide.' " Bateson, as a biologist (4), tells us that " it is in a decline in the birth-rate that the most promising omen exists for the happiness of future generations." Wilcox (96), from the figures of the statistician, finds no grounds for despair although admitting the obvious danger of recruiting society in majority from the lowest level of humanity, owing to the failure of the better to keep up their numerical standard. Chapple (7) sends forth a book from New Zealand, however, which sees calamity in the swamping of the better through the greater fecundity of the orders that are the last to learn preventive measures and the last, perhaps, to practice them.

Doctor Hall's comprehensive treatment of the question of fecundity (40) and its relation to Spencer's law of the inverse ratio of fertility and individuation would suggest that the upkeep of the numerical standard in families will tend more and more to be of a rational and eugenic character, and that in proportion as culture and intellectual development carries with it a comprehension of the principles of racial welfare will the birth rate be regulated in accord with eugenic aims.

Before he died (Jan. 17, 1911), Galton's charming and modest autobiography appeared, closing with the following words in regard to Eugenics (37, p. 323):

> "Its first object is to check the birth-rate of the unfit, instead of allowing them to come into being, though doomed in large numbers to perish prematurely. The second object is the improvement of the race by furthering the productivity of the fit by early marriages and healthful rearing of their children. Natural selection rests upon excessive production and wholesale destruction; Eugenics on bringing no more individuals into the world than can be properly cared for, and those only of the best stock."

From July 24th to 30th, 1912, about 800 men and women, including some of the foremost scientists and scholars of Europe and America, registered at the *First International Congress on Eugenics* held in the Imperial Institute, University of London. The Congress was not technical; most of the 35 papers were of a practical nature, but all were on a high level of seriousness and accuracy. Through the sympathetic action of the London press the ideas and ideals of the Congress were made widely public with the result that not only has there been an increasing number of serious students of the subject, but also the American caricaturist, journalist, short-story writer, novelist and playwright have been given a new instrument for the befuddlement of people's minds.

France, whose population in 1811 was 16% that of Europe, and in 1911 about 9%, and whose birth rate has been steadily falling until her contribution to the world's increase is only about .3 per thousand, has, through child-labor laws, compulsory education and old age pensions lessened the economic value of children to their parents and now welcomes positive eugenic measures such as subsidies for large families, reduction of personal taxation in accord with family increase, etc. Institutions such as the *Allaitement Maternal, Ligue des Mères des Familles, Consultation de Nourrissons* and *Mutualité Maternelle,* whose work Dr. Smith (83) has reported as encouraging the right of motherhood, an endeavor to lessen infant death and the propagation of eugenic ideas among the people may, when multiplied, show an appreciable effect on the differential birth-rate.

Almost contemporaneously with Galton, Morel (57) saw in the regenerative influences acting on races of plants and animals a suggestion for a possible analogous improvement in the human stock by proper crossing and racial mixture. He pointed out the dysgenic effects of alcohol and drugs on the race, warned against consanguineous marriages which tended to emphasize defects in a line and hoped for the same improvement of humanity through attention to breeding, as Galton saw in his vision. Moreau (58) followed with a work in which he grouped all brain and nervous disorders in a category with insanity and idiocy, tracing their origin to a genetic predisposition and postulating a hereditary cause back of nearly all degeneration. Later still Féré (24) brought out this theme in great detail but with the modifications and caution that a much larger accumulation of pathological data rendered necessary.

Bertillon (5), chief of the Statistical Bureau of Paris, holds up to France its "natalité pathologique" in warning of coming calamity and scores its practicers of variegated neo-malthusianism, setting against them the ideals of racial upbuilding through breeding from the best of French stock and the "practicable eugenic suggestions" that have been seriously considered in France for the stimulation of family increase. Every question of the day, he urges, should be placed secondary in the minds of his countrymen to: "Comment empêcher la France de disparaître? Comment maintenir sur terre la race français?"

An elaborate research along Galtonian statistical and anthropometric lines was made in Russia by Orchansky (71), whose only claim for the study is one of suggestiveness and whose data and results justify this claim. His facts, beautifully reduced to tabulations, graphs and curves, led him to draw inferences relative to sex ratios, sex determination, etc., which bear much less weight since such studies as those of Morgan and other experimentalists lead us to look for a solution of these problems in the nature of the germ-cells instead of in statistical correlations. Another of his many tentative conclusions was that hereditary tendencies to morbidity were greater in boys than in girls.

The *Internationalle Gesellschaft für Rassenhygiene,* a union of constituent societies in Germany, Sweden and Switzerland, is patterned after the *Eugenics Education Society* of London and carries its educational principles so far as to pledge its members to ascertain their fitness or unfitness for marriage and to remain single or at least abstain from parenthood if there is danger of their offspring falling below par. No attempt can here be made to more than refer in passing to the biological and sociological studies of eugenic color that have appeared in the official *Archiv* of this society, other than the few referred to in another section.

The *Institut Solvay,* at Brussels, Belgium, has extended a welcome to eugenic investigators and put its fine library and laboratory equipment at their disposal. In Denmark a committee is at work on proposed eugenic investigations. "*Eine ungarische eugenische Gesellschaft*" has been formed in Hungary. The interest in Italy is reflected in a number of the longest studies presented at the London Congress, and Japanese scholars tell us that Eugenics for Japan will mean in large measure simply a return to some of their good old marriage-selection customs placed in a modern setting, for the principles of breeding for human soundness have been recognized by these people for many generations.

The *American Breeders' Association,* born in 1903, appointed, in 1906, a committee to investigate the claims of Eugenics to scienceship and in 1910 raised this committee to the rank of a section in the Association. At this time the *Eugenics Record Office* was opened at Cold Spring Harbor, Long Island, near the experiment station of the Carnegie Institution. With C. B. Davenport as Director and H. H. Laughlin as Secretary the Record Office has become to the United States what the Galton Laboratory is to England and has been issuing a series of Memoirs and Bulletins embodying the results of the research work done under its direction or supervision. An endeavor is being made to gather hereditary data through the use of record blanks which are distributed gratis to anyone who shows inclination to fill them out with facts concerning his ancestry and immediate relatives.

Mr. Laughlin has published a first report (52) of the work of the Record Office to which I am indebted for the following facts: Mrs. E. H. Harriman has presented a new fifteen thousand dollar office building at Cold Spring Harbor for the housing of records and equipment. Mr. John D. Rockefeller has, since October 1, 1911, provided money for the salaries of five field workers, and has met the cost of publishing the memoirs, and half the cost of the training class. The Record Office has expended, to January 1, 1913, $51,280.12, and collaborating institutions have spent approximately $7,000 in conducting research work.

Harvard, Columbia, Cornell, Brown, Wisconsin, Northwestern and Clark Universities are offering courses in whole or in part devoted to Eugenics. Some first hand investigation has been undertaken by organizations in the Y. M. C. A. as part of a year's course of study in Eugenics. Many Women's Clubs have included a serious consideration of Eugenics in their programs and professional lecturers are adding this subject to their repertoire. At the San Francisco World's fair Eugenics will be given independent recognition in the section on Social Economy.

During the Academic year of 1913 a number of lectures on Eugenics were given by professors in leading American Universities at the request of Mrs. Huntington Wilson, who has since made it possible for the Eugenics Record Office to offer the services of an extension department, including a lecturer, to all organizations of an educational nature, including Women's Clubs, Churches and Societies. Further reference to the work done by the members of the Record Office staff will be made later.

The *American Genetic Association,* with headquarters in Washington, D. C., through the medium of The Journal of Heredity, ably edited as it is by Mr. Paul Popenoe, hopes to reach a large reading public interested in keeping in close touch with the genetics movement and Eugenics in particular.

Several thousand infants have been weighed, measured, mentally tested, scored by points and classified as to fitness at the *baby health contests* held in some 40 states during the last three years. The standardising score-cards are still crude, the method of measuring arbitrary, the mental testing largely amateurish and of little scientific value. Linking the contests with cattle-shows has hardly been a factor in their favor. Some of them have been unhygienic and hard on the babies. As an index to the rise of the curve of interest in babyhood, and as a pioneer effort to attract attention to the child-welfare aspect of Eugenics, however, they may not have been held in vain.

In 1911 about 300,000 babies died in their first year. Seven-tenths of the 42% that died in the first month did so as the result of prenatal conditions or accident at birth. Of those living less than one week, 83% died from such causes, as did 94% of those that lived less than a day. The Children's Bureau at Washington has published a pamphlet, to be had for the asking, telling how half these deaths may be prevented by prenatal care and postnatal hygiene. The author is a university graduate, a government expert and herself the mother of a family. This booklet is the first of a series of publications that promises to be distinctly eugenic in its spirit, as it should lead to a desire to know more concerning hereditary laws.

With the foregoing sketch as historical background, a few samples taken from the work that has been and is being done will show the general trend of the movement.

Analogical Studies

Galton (37), besides throwing Darwin's provisional theory of pangenesis out of court through the famous blood-transfusion experiment on rabbits, thought that Eugenics could gain much by co-operation with comparative biology. He himself bred peas on a large scale to determine regression, finding the mean filial devitation in size to be one-third that of the parental. He also began an unsuccessful experiment in heredity with the moth *Selenia illustraria* and suggested the breeding of dogs for mental qualities as well as for physical peculiarities. Old age alone prevented him from carrying out more experiments of an analogical nature, but the science of Genetics has assumed this labor in earnest.

It is largely from the geneticist that the eugenist must take his cue. In the University of Chicago lectures on heredity in relation to Eugenics (5), in the summaries of the genetics movement by Bateson (3) and Punnett (76) and in the admirable text-book by Walter (92) the connections and the gaps between the two sciences are made plain. Although the respective lines of research may seem now to present a case of parallelism without interaction, some of the facts already brought to light are encouraging to those who look forward to a final meeting at a common point.

Since Aristotle wrote his "History of Animals" there has been contention as to inheritance of acquired characters, from mutilations to intellectuality. Even since Weismann pickled his 1592 detailed mice which, through 22 generations, failed to show caudate modification, biologists have continued to experiment and philosophers to speculate on this question.

Ribbert (80), to test the effects of blood-constituents on germ cells, injected carmine coloring matter into the veins of animals, finding most of the organs examined stained in the process but the germ cells untouched, showing their unique isolation and protection. He thinks that a long continuation of this process will show germinal modification, and believes that as certain body-cells have an affinity for certain substances and poisons, so the germ-cells have theirs, and it is the business of the eugenist to discover what they are. A rather curious speculation in this connection is his idea that a once poisoned germ plasm may in five or six generations free itself from the deleterious effects of its once toxic *milieu* if they be not repeated.

As to the influence of selection in modifying a species, the experiments of Johanssen with beans which insisted on regressing to the mean of their own pure line no matter what extreme he bred from; Tower's unsuccessful attempt to get a dark breed of potato beetles by mating the darkest of a medium colored line; Jennings' inability to modify paramecia through selection over 20 generations and Pearl's failure to raise the egg-laying capacity of hens by selective matings within the same breed would suggest that no modification can thus be brought about.

Castle transplanted the ovaries of guinea-pigs, and Davenport those of fowls, finding no foster-maternal influence on offspring obtained from them, and the main body of experimental evidence seems against the transmission of characters recently acquired through the influence of environment. Nevertheless, there have been a number of pragmatic studies showing that offspring, at least in the first generation, may be affected through influences playing on parents, and these carry special eugenic interest.

Hodge (43) conducted 28 experiments in alcoholizing dogs to test the effect on offspring. Of the normal controls 4 offspring were deformed, none born dead, 41 viable. The alcoholized dogs gave 9 dead born, 8 deformed, and only 4 out of 23 viable. Alcoholizing males and mating them with normal females affected offspring in the same way as did alcoholizing females. Nice (62) alcoholized white mice and found that 11.1% of their offspring died young while none of the offspring of normal controls failed to reached maturity. Stockard (84) caused guinea-pigs to inhale alcohol six days a week until they showed signs of intoxication. Forty-two matings gave 18 born alive and of these only seven, five of which were runts, survived more than a few weeks. Nine control matings gave 17 young, all of which survived and matured normally. The results were practically the same whether the male or the female was alcoholized. Mjoen (56) reports the work of Mairet and Combemale on dogs and that of Carlo Todde on cocks. Of 12 whelps of an alcoholized male and abstinent female, 3 died fortuitously, 2 were still born, and 7 died within two months. Acute alcoholization of cocks killed them without noticeable effect on the germ plasm. Chronic alcoholism, however, caused young cocks to lose their sexual characters and to cease crowing. The weight of their testicles was considerably reduced and the spermatic channels were deformed. Perhaps more eugenically suggestive than these experiments, however, is the work of the Mendelians.

The new *ism* that is with us because Gregor Mendel considered the peas of his garden and how they grew is built on the conception of unit characters and their determiners. Mendelism regards an individual as a mosaic of independently inheritable characters whose appearance depends on the way in which their respective determiners are thrown together in the zygote or product of the union of two germ-cells, each bearing determiners. To illustrate: Darbishire (12) bred the waltzing mouse, *Nankin Nezumi,* an animal characterized by an epileptiform lack of control over its movements, with the common mouse and obtained a first hybrid generation of mice none of which exhibited the waltzing. Mating these among themselves gave 555 individuals, 95 of which were waltzers.

"Organisms that appear to be alike, regardless of their germinal constitution, are said to be identical phenotypically, or to belong to the same phenotype. Organisms having identical germinal determiners . . . are said to be genotypically alike, or belong to the same genotype" (92, p. 113).

In the first hybrid generation of mice the genotypic character of waltzing was hidden by the *dominance* of what Darbishire terms the "determiner for normality," that is, it was latent or *recessive.*

Darbishire also bred a common albino mouse to a waltzer of similar color save for a patch of yellow on shoulders and haunches. The result was a dark grey hybrid of normal movement and black eyes, evidently a case of regression. Mating two of these hybrids gave about one-fourth albinos, one-half dark colored mice with black eyes, and one-quarter pale mice with pink eyes. This generation consisted of waltzers and normals occurring in all three color groups, showing that there was no relation between the inheritance of color and that of movement and making a pretty demonstration of unit-character transmission.

Where single unit characters behave as dominant and recessive, as in the case of waltzing and, "normality," the ratio of dominants to recessives in the second generation has been found to closely approximate 3 to 1. Two of the three dominants will, if mated with their like, split up into the same ratio, while one of them will breed true to its kind as will the one recessive, when mated to their genotypes.

Some future Leibniz may fill all the gaps between mouse and man; but he who cannot intuit the connection between the mendelizing of a neurosis in mice and the outcropping of a similar condition in men probably lacks the determiner for imagination.

Pathological Studies

Darbishire postulated the absence of a determiner for normality of movement in the waltzing mouse. Rosanoff (81), in studying the inheritance of the neuropathic constitution in man, assumes that,—"full development and normal function of the mental faculties are dependent on the presence of a special determiner in the germ plasm. His 'neuropathic constitution' is a blanket term covering several manifestations of an abnormal nervous system, such as insanity, epilepsy and feeble-mindedness. According to neo-mendelian classification, if an individual inherit a determiner, say for normality of nervous structure, from both parents, he is termed duplex for that character, if from but one parent, simplex, and if from neither parent, nulliplex."

From material selected to exclude psychoses and neuroses produced by disease or accident, and considering ancestral influences only as far back as grandparents, Rosanoff summarizes his finding in the following table:

CLOSENESS OF CORRESPONDENCE BETWEEN ACTUAL FINDINGS AND THEORETICAL EXPECTATION ACCORDING TO THE MENDELIAN THEORY

	Neuropathic Offspring		Normal Offspring	
Types of Mating	Found	Expected	Found	Expected
1. RRxRR = RR				
2. DRxRR = DR + RR	190	214½	239	214½
3. DDxRR = DR	0	0	45	45
4. DRxDR = DD + 2DR + RR	107	80½	215	241½
5. DDxDR = DD + DR	0	0	77	77
6. DDxDD = DD	0	0	0	0
Totals..................	351	359	586	578

DD duplex (dominant), DR simplex (dominant), RR nulliplex (recessive).

This method of classification and analysis has been adopted by other field workers, notably Miss Collins (27) and Miss Danielson (11), whose findings, although suggestive of the mendelizing of neuropathic traits, have not fallen in so closely as Rosanoff's with expectation. The obvious danger of fitting facts to theory is doubtless avoided as much as possible, but the criticism against this method of investigation, that standards of measurement are not yet generally acceptable in regard to many traits classified, will hold good until such standards are established.

Goddard's (38) Kallikak Family strongly points to mendelizing in feeble-mindedness, forty-one nulliplex matings giving 222 children but two of which were considered definitely feeble-minded. Eight cases of normal mother and feeble-minded father gave ten normal and ten defective offspring, an exact correspondence with expectation. When one parent was feeble-minded and the other undetermined, nearly all the children were affected, from which it is inferred that the other parent was also defective. Here we have a case of dangerous inference, but here also the distinction should be made between a study largely sociological and suggestive in nature and those that claim scientific value in the field of heredity. The Kallikak family, on the basis of which eugenic field work and the mendelian hypothesis have been criticised, is not a scientific memoir, but an interesting and suggestive description of a piece of pioneer work.

From a study of 181 fraternities, comprising 206 epileptic individuals, Davenport and Weeks (94) concluded, using the mendelian classification, that epilepsy is due to the lack of a determiner for normal development. Weeks (95) carried this study further, and from 388 different fraternities studied, he concludes that " epilepsy cannot be considered a mendelian factor by itself, but that epilepsy and feeble-mindedness are mendelian factors of the recessive type " and " each is due to the absence of a protoplasmic factor that determines complete nervous development."

F. W. Mott (60) analyzed 3,118 cases of related insanity made up from 1,450 families. He found in 18 families where insanity had been manifest on both sides 116 children, 16 of whom died young, 39 were suicidal or otherwise nervously disordered, and 61 apparently normal, making 36% of this set tainted. Ninety families with insanity on one side only showed only 9.6% adult offspring affected, 40 having died young, 33 showing nervous affection and 311 appearing normal.

The need for refinement of analysis of material studied is obvious from the foregoing. Even in such a simple case as the inheritance of catract, Laughlin (51) has shown that not only is this affection a dominant defect, but that each type of cataract (lamellar, coraliform, anterior and posterior) behaves as a single unit. Thus the generic name cataract may stand for a compound unit much as the neuropathic constitution represents a number of potential neurotic manifestations, the inheritance of each of which must be studied separately as well as in relation to its fellows. It is also plain that we have no true and definite standard for " normality " as yet, and no one would sooner admit that this is a purely relative term than the serious student of human heredity.

From the data already gathered in the field of morbid heredity, Davenport (13) has tentatively summarized those affections which appear to behave as mendelian dominants. These are: faulty enamel, toothlessness, pre-senile cataract, night-blindness, poly- and brachy-dactyly, piebaldness and possibly diabetes insipidus. In the normal field, brown eyes, caused by the presence of a determiner for brown pigment on the anterior surface of the iris, also act dominantly, rendering blue eyes, which lack the pigmentation, recessive. The affections behaving recessively are: Thomsen's disease, weakness of the mucous membranes, hemophilia, color-blindness, retinitis pigmentosa, and deaf mutism.

Adami (1) goes into much greater detail, classifying as "homeomorphous inheritance" the appearance in offspring of the same influence and symptomatology as characterized the parent, and as "heteromorphous inheritance" all that appears interchangeable, such as migraine, epilepsy, neurasthenia, hysteria and the neurotic manifestations in general. His list of homeomorphous morbidities is too long to include here.

Von Lundborg (90) would add dementia precox to the list of Mendelian recessives. Working among the people of Listerland, in the south of Sweden, and reckoning only children over 15 years of age he found:

No. of Families	Nature of Mating	Children Normal	 Affected
11	(DD x RR)	44	..
5	(DR x RR)	20	20
11	(DR x DR)	53	24

It is hardly necessary to mention that the only value of this item from his ponderous study is its suggestiveness, as the data are insufficient for a final conclusion.

Susceptibility to diseases caused by pathogenic bacteria may or may not be inherited. The controversy regarding the inheritance of tuberculosis or the diathesis theretoward has been long and heated.

For several years the statistical artillery of the Galton laboratory has been trained on the problem of tuberculosis. The following correlations between *husband and wife* with regard to phthisis, based on the study of 1,000 marriages, were found:

All poor (Goring)	—.01
Prosperous poor (Goring)	.16
Middle class (Pearson)	.24
Professional (Williams)	.28

These correlations, taken with that of .17 obtained by Pope in a study of 41, 786 couples who were parents of at least one tuberculous child, lead Pearson to place the average coefficient of correlation at .30. Pearson worked out the correlation between *parent and child* for Phthisis and found it to be .55, while Goring with unlike material places it at .52 (86).

Because Nageli found tuberculosis in 97% of his 500 autopsies and the studies of various German specialists seem to prove that 50% of adults who die from other causes have suffered from latent or healed tubercular lesions, Pearson (72) concludes that certain individuals are relatively immune and others hereditarily predisposed to this disease. Leaving no room for a possible discovery of variation on the part of the microbe as well as of the individual, and without evidence satisfactory to sociologists such as Ward (93) or Hobhouse (42) that there would be a net gain to humanity in cutting off the entire tuberculous stock, Pearson would uphold selective marriages as a solution of the problem.

Saleeby (82) calls alcohol a "racial poison" both on the score of its congerminal effect as upheld by Forel (28) and of the congenital influence on the fetus and mammary secretions which is now generally accepted. Mjoen (56), who devoted years of study to a few single cases of alcoholism, cannot accept Forel's theory of blastophtoria "in any other sense than that alcohol prevents the restitution or regeneration of already tainted germ plasm." He concludes that alcohol can only affect sound stock when taken during conception, maternity or lactation. Adami's (1) teratological material would probably all come under Mjoen's rubrics, and in fact Forel (28) and Archdall Reid (77) also take the view that the racial effects of the poison might be much worse were it not that it so thoroughly affects ovary and testicle of those especially susceptible to its inroads as to prevent the development of much unfitness.

A second racial poison is lead, which, according to Oliver (70), who has given it a most extensive study, diminishes the number of red corpuscles in the blood of lead workers, works havoc with the reproductive powers of both men and women and is a notable cause of abortion. Details of the several hundred pregnancies investigated and recorded by Oliver (70) and Adami (1) cannot be given here, but, speaking generally it would seem that ". . . the malign influence of lead is reflected upon the fetus and on the continuation of pregnancy 94 times out of 100 when both parents have been working in lead, 92 times when the mother alone is affected, and 63 times when it is the father alone who has worked in lead." (70, p. 200.)

To the foregoing genotoxins must be added those of syphilis and gonorea, diseases whose occultation from general public consideration has until recently been nearly complete. Since the great European epidemic supposed to have started in Galicia, Spain, in 1494 and which spread over France, Germany and Switzerland in 1495, Holland and Greece 1496, England and Scotland 1497, and Russia and Hungary 1499 there have been recurrent rises and falls in the wave of effort to exterminate the plague. In 1496 the French parliament required all persons affected to leave the city within twenty-four hours. The problem was not solved so easily, however, and legislation regulating prostitution has been the principal method of dealing with the disease until recent years, when attention has been directed to the medical and educational aspects.

In 1864 England passed the Contagious Diseases Act, attempting to regulate prostitution, but repealed it in 1886 owing to the popular demand for "personal liberty." Not until 1899, when an International Congress was held at Brussels, did the subject come up again for serious attention. In 1905 an attempt was made to have the government take the matter in hand, but owing to the resignation of Mr. Balfour nothing was done at the time. In 1912 the *Royal Society of Medicine* and the *Eugenics Education Society* appointed a committee to report, and this will be ready soon. In August, 1913, the *Medical Congress* resolved to give the subject earnest attention.

Pioneer work in bringing the attention of the American public to a realization of the hereditary scourge of venereal disease was done by Morrow (59) and a first crop of reports concerning prostitution and its culture media, is now available. Of these the reports of the Chicago Commission, the Committee of Fifteen of New York, Kneeland's recent survey of conditions in New York City, and Doctor Flexner's summary of prostitution in Europe are the most notable.

SOCIOLOGICAL STUDIES

Perhaps the light of Galton's idea of breeding better men is dimmed beneath the bushel of the accepted definition of Eugenics as "the study of agencies under social control that may improve or impair the welfare of future generations," but before it can be set upon the hill-top it must square with social ethics. We cannot cast the bantling on Lycurgan rocks nor consign our weaklings to the Platonic lethal chamber. The problem, then, is to determine who are the fit, and how best to eliminate the defective, by other than these simple means used centuries ago.

The ancients regarded idiots, imbeciles, the feeble-minded and neurotic as god-cursed and fit only for reproach and persecution. The Spartans made short work of them. Early Christians were compassionate and merciful. Confucius, Zoroaster and Mohammed advocated charity toward them. In mediaeval times they became court fools or wandering "enfants du bon Dieu." With Luther and Calvin came persecution again, and they were treated much as they are in some American schools to-day, and worse. Then appeared Pestalozzi, practicing what Rousseau preached, followed by Froebel, and child study began. Dr. Itard experimented with the "Sauvage d'Aveyron" along Froebelian lines and led Seguin to see a great light in the change wrought in the wild boy. In 1837 Seguin founded a school for idiots in Paris and later brought his gospel to America.

In 1842 Guggenbuhl studied the cretins in Olienthal valley, Switzerland, continuing his work at an asylum near Berne until, through his influence, a colony for cretins was founded at Interlaken with cottages and hospital. Fresh air, sunlight, variety of stimuli and good food improved many patients notably. In 1850 Guggenbuhl was impeached for charlatanism and the institution abolished. He died in 1865, protesting innocence.

Saegert started a class for imbeciles in Berlin in 1845 and by 1881, 32 such classes were formed. Since then the idea of training schools for backward and defective children has spread widely through Germany.

The writings of William Twining on Guggenbuhl's work led the Misses White to found a private school for defectives at Bath, England, in 1843. In 1848, Park House, High Gate, was made the home of 27 children and two years later these, with 23 more, were removed to Essex Hall, near Colchester. Since that time the interest in and attention given to this problem has increased to national dimensions.

The Mental Deficiency Bill (55), "an act to make further and better provision for the care of the feeble-minded and other mentally defective persons and to amend the lunacy acts," was passed by the House of Commons on July 30th, 1913, was slightly amended by the Lords August 12th, 1913, and will come into operation on April 1st, 1914. This Act does not extend to Scotland or Ireland.

A person who is a defective may be dealt with under this Act by being sent to or placed in an institution for defectives or placed under guardianship—

(a) At the instance of his parent or guardian, if he is an idiot or imbecile, or at the instance of his parent if he is under the age of twenty-one; or

(b) If in addition to being a defective he is a person—1, who is found neglected, abandoned, or without visible means of support, or cruelly treated; or 2, who is found guilty of any criminal offense, or who is ordered or found liable to be ordered to be sent to a certified industrial school; 3, who is undergoing imprisonment (except imprisonment under civil process), or penal servitude, or is undergoing detention in a place of detention by order of a court, or in a reformatory or industrial school, or in an inebriate reformatory, or who is detained in an institution for lunatics or a criminal lunatic asylum; or 4, who is a habitual drunkard within the meaning of the Inebriates Acts, 1879-1900; or 5, in whose case such notice has been given by the local education authority; or 6, who is in receipt of poor relief at the time of giving birth to an illegitimate child or when pregnant of such child.

This bill, the whole of which covers some forty legal pages with further details has been attacked severely by writers in the English press, on both medical and sociological grounds. Only a passing reference can be made to it here as an indication of the fact that the problem of the feeble-minded has at last become a national one.

Through Horace Mann and George Summer, Seguin's work was made known in America and in 1854 the first idiot-asylum and training school was established at Albany, N. Y. The following year Massachusetts opened a school of like nature, followed by Pennsylvania in 1852. Since then the number of state institutions has grown to 35, there are 19 private training schools, and in 1911, 99 cities had public school classes for mentally defective pupils, and 220 had classes for the mentally backward.

Colonies for epileptics have been established in Connecticut, Indiana, Kansas, Massachusetts, New York, New Jersey, Ohio, Texas and Virginia. Iowa has made an appropriation for a colony, Illinois has appropriated $500,000 for a site and plant ultimately to cost $1,000,000, and Michigan has begun work on an institution to include a farm of 1,000 acres.

Aiming to establish norms of mental development up from the lowest types of amentia to complete normality, the research laboratory of the Training School at Vineland, N. J., has tested several thousand children by the Binet-Simon scale, slightly modified to fit American conditions. No sweeping generalizations have been made, but the data thus far collected suggest that feeble-minded infants are heavier at birth than normals, lower grades of defectives arrive at puberty earlier than the higher grades, form mastery develops early and is correlated with the curve of intelligence, number concept rarely develops in the feeble-minded and mathematical ability never, and the Mongolian type of imbecility may be due to intra-uterine arrest of development perhaps at about the second month. Biochemical and neurological examination is made of all cases and biochemical analysis made in all cases where autopsy is permitted. Cumulative evidence of the rôle played by heredity in all classes of mental defect is also notable in the results of the laboratory's investigations. A report on the heredity of feeble-mindedness and its relation to social problems is now in preparation. This will be a study of 327 cases from the Vineland Institution, including 327 charts, over 200 portraits of children, a brief description and history of each child, a statistical study of the data from several standpoints including the various supposed causes of feeble-mindedness, such as alcohol, syphilis, tuberculosis, injuries at birth, fevers and heredity. The relation of all this to the social problems of alcoholism, pauperism, crime, prostitution, etc., will be treated. Doctor Goddard (38), Director of the laboratory, has already preluded this work in the remarkable report of the Kallikak Family, from one member of which sprang 496 known descendants all but two of whom were respectable and useful citizens and also, through a clandestine mating with a feeble-minded girl, 480 mediocre and sub-normal individuals, 143 of whom were distinctly feeble-minded. Miss Kite, Field Worker for the laboratory, in her tracing of the Kallikak pedigree has unearthed a wealth of sadly interesting information relative to the condition of humanity in the New Jersey " Pineys " and opened the way for further investigations of the classic " Jukes " type.

In 1887 Dugdale (16) published his report on " The Jukes," a tribe of degenerates infesting a section of the State of New York, numbering some 1,200 individuals of whom 280 were professional paupers, 140 criminals, 60 habitual thieves and 50 prostitutes. A total of 2,300 years in the poor-house, seven murders, various depredations and incendiarisms and an incalculable amount of venereal disease rested on their heads. Their cost to the state when Dugdale reported was estimated at $1,308,000. What it has been since, through the inactivity of municipal and State authorities is beyond computation.

Since Dugdale reported, a number of special studies of like nature have been made and more are in the making.

" The Tribe of Ishmael " (53) was a family stock traced back by McCulloch to 1790, comprising 30 family units and 62 individuals whose descendants in the sixth generation numbered 1,750 known and 5,000 estimated with a history closely resembling that of the Jukes.

Estabrook (17a) studied " The Nam Family " in the backwoods of New York State, finding 784 individuals of whom 19 were epileptic, 24 insane, 15 in orphan asylums, 3 in girls' home and 40 in State Prison. Of the females 88% were alcoholic and of the males 90%. Licentiousness characterized 232 women and 199 men. The cost to the State is estimated (including the " drink bill ") at about $1,500,000.

" The Hill Folk," two families of a New England rural community were investigated by Florence Danielson (11) who found, among 737 persons dealt with, 136 feeble-minded, 10 epileptic, 24 showing criminal tendencies and 8 prostitutes. Alcoholism in greater or lesser degree characterized nearly all, 65 received state aid and 37 were state wards.

The Hucks, a degenerate family of farmhands, woodchoppers, etc., made up mainly of the moron class of defectives, are being analyzed by a field worker for one of the large hospitals of Massachusetts. Her results are not yet ready for publication, but thus far 315 Hucks, including 121 others who married into the family, have been included in the study. There have been 112 matings producing 12 epileptics, 50 alcoholics, 52 sexually immoral, 56 probably sexually diseased, 48 feeble-minded, all morons. Since 1860 the town they inhabit has appropriated $13,555 for their care.

" The Village of a Thousand Souls " is a middle-western town observed by Gesell for the past 33 years. Out of 220 families, feeble-mindedness was found in 37, alcoholism in 36, insanity in 22, epilepsy in 3 and a number of eccentrics scattered throughout the village.

Eugenic marriage laws, so called, have been passed in 23 States and 3 territories, the conditions under which marriage is denied being as follows (14) : insane 24, idiot or imbecile 23, epileptic 9, feeble-minded 8, pauper 4, drunkard 3, physically incapable 3, venereally diseased 3, and habitual criminal 1.

It has fortunately not been necessary to multiply such investigations before the realization that something must be done struck home to those in power to do it. Whatever may be said as to the value of the marital legislation already in force, the trend seems to be in the right direction.

With minor variations in different states, marriage within and not including the fourth degree of consanguinity computed according to civil law is forbidden in the United States. The study made by Miss Elderton (18) in England, and that of Arner (2) in the United States, however, seem to show that cousin marriages are not injurious *per se,* but merely enhance the probability of parental defects characterizing offspring. This has led Davenport (14) to suggest forbidding first cousin marriages when in the parental fraternity common to both, grave defects known to be hereditary have appeared. Along with marriage regulation marches the sterilization of extreme cases of defect. California, Connecticut, Indiana, Iowa, Kansas, Michigan, Nevada, New Jersey, New York and North Dakota have passed laws permitting the operations of fallectomy and vasectomy in accord with state regulations. In

Oregon the law has passed but was withdrawn by referendum in November (1913).

Owing to the backfire of public opinion, these laws are now practically inoperative. The New Jersey law was declared unconstitutional when tested in the courts, but further appeal will probably be made.

As early as 1903 Doctor Rentoul (78) agitated for sterilization of criminals and defectives in England, but the idea has not gripped in that country. Europe first generally discussed the subject, according to Ellis (21), in 1909, when two women and two men, inmates of a Swiss asylum at Wil (Berne) were sterilized by castration and ovariotomy and allowed to go free. Since then much has been written on the psycho-physical effects of different methods of sterilizing and on the social aspects of the problem, the consensus of expert opinion being presented to the Eugenics Congress in 1912 by Van Wagenen (89). The principal conclusion is that segregation should be urged and sterilization resorted to only in extreme cases and then only with the consent of the patient or those responsible for him.

The cosmopolitanism of the United States renders its national eugenic problem extremely complex. Not only must legislation be aimed at keeping up the level of the actual stock, but an eye must be kept on the stream of foreign germplasm that constantly flows in from all sides.

From 1892 to 1912 the number of aliens debarred from entrance to the United States was 169,132, the causes being: pauperism or likelihood of becoming a public charge 58.2%, contagious diseases 15.8%, contract labor 12.7%. The remaining 13.3% were defectives, such as professional beggars, anarchists, the feeble-minded, prostitutes, etc. The proportion of those refused entrance at port of entry to those detained by examination at port of departure, Fairchild (23) estimates at about 4 to 1. He regards American inspection methods thorough as regards the feeble-minded, but the committee of the American Breeders' Association, (79) appointed to investigate this matter reported that (a) immigration laws are inadequate to exclude the unfit, (b) inspection is not thorough, and (c) inspectors are too few in number and apparently not trained in the best methods for the detection of mental deficiency. The inspector's side of the matter has been presented by Glueck, Knox and others (63-69).

Mr. Lathrop Brown of New York (3b) brought the hereditary aspects of immigration before Congress and it may be hoped that his voice is that of one crying in the wilderness to make ready the coming of a eugenic attitude on the part of national legislatures toward problems that bear so largely on the welfare of American stock.

Thus far the sociological aspects of the problem seem sorry and dysgenic, but at least the solution is relatively simple. Segregate, prohibit marriage, sterilize—all three measures are within the limits of agencies under social control. When, however, it comes to selecting a breeding class from the fittest of mankind the Eugenist tackles the trinity of biology, psychology and sociology rolled into one problem of formidable bulk. It is in the latter two elements that he finds the greatest difficulty.

Flick (26), as mouthpiece of the Roman Catholic Church, gives his view of Eugenics thus:

> "The definition of Eugenics as given by the Eugenics Education Society . . . the program of the Eugenics Congress and many of the ideas that were expressed at that congress; most of the books which have been recently written on the subject . . . makes a discordant hodge-podge of bad philosophy, overgrown humanity born of extremely diluted, ill-nourished, anaemic Christianity and an unconscious erotism which does not bode well for civilization."

From the anti-religious and ultra socialistic standpoint, eugenic measures are even worse painted. Swift (85), writing of the millionaire, declares that,—"We child breed and place ourselves in the jaws of these gentle gorgons who crunch their riches out of all honest workers. . . . Those decent enough to abhor having their children mature as servile grooms of the rich abstain from having families; these abstainers are thoughtful, spirited and better, whose offspring would make for a higher population, and the meaner, stupider, cravener become the general begetters and the race rots." Under present conditions of capitalistic rule he thinks the family becomes the "microbe of society" and the limitation of population is but the "strike of calving slaves" who refuse to "contribute their nest of children to the wheels of toil." Next in order of evil to the millionaire is the church, his minion, which has kept the people "brutishly ignorant that they might beastfully breed" and the "fortunate collapse of religion has removed the check of ignorance concerning the means" and the "boycott on the procreation of tenders and feeders of the swilling rich" is upon us. The only justification of breeding to-day is for the purpose of destroying the system of fixed incomes which has placed us in bondage. "The new race must be absolute revolutionists" if there is to be racial salvation. "The French alliances, casting about batlike for the smallest possible bribes to spur the people to propagate" have for their object the continuation of the present function of marriage which is to "multiply the young for the hoppers of the rich" and Eugenics is a sop thrown out to attract attention from the vital problems of the hour.

Flick (26) when he wrote of the irreligiousness of Eugenics and claimed for the church the control of family relations and the creation of new souls had evidently overlooked or ignored much of the more general literature on Eugenics in which is to be found great earnestness in advocating, and more or less clearness in presenting, the subject in the sense that Galton himself regarded it, a part of the religion as well as of the science of years to come.

Saleeby (82) whose contemplation of Galton's New Jerusalem is not distracted by too close attention to any one of its many mansions tells us of Eugenics:

> "It honors men and women by declaring that human parenthood is crowned with responsibility to the unborn, and to all time coming . . . and it makes a sober and dignified claim to be regarded as a constituent of the religion of the future. . . . Eugenics must become a living part of our religion—a religion of the most lofty and austere because the most altruistic, a religion which sets before it a sublime ideal, the intrinsic ennoblement of mankind. . . . We must create a Eugenic aspect for the moral sense. . . . If we have transferred our hopes from heaven to earth and from ourselves to our children they are no less religious 'and they that shall be of us shall build up the old waste places; for we shall raise up the foundations of many generations.'"

Dawson (15) portrays Jesus as the biological culmination of a long line of religio-moralists who should be, on the ethical side, our eugenic ideal. His doctrine of woman and motherhood strikes a chord that, as Grassl (39) has shown, needs heeding in this feministic day, for, "What shall it profit a woman if she gain the whole world of academic and social distinction and lose her own soul of motherhood?"

Chamberlain (6) thinks that all may be well if Eugenics "can always retain a sense of the divinity of the greatest human passion, and sustain the test of Shakespeare's immortal dictum." Decrying military eugenics, breeding better food for powder, and all semblances of the human stud farm, he believes—"The preservation of the family (eugamy) must form a part of what has been called the 'chivalry' of Eugenics . . . and . . . the ultimate eubiosis must be thoroughly human."

Mr. and Mrs. Whetham (98) have not forgotten to include the religious aspects of Eugenics for, "without religion and without morals there is apparently no possibility of existence for the human race, and . . . a sense of right and wrong and a recognition of some outside influence moulding human nature has become part of the unconscious heritage of mankind."

Havelock Ellis (20), while he does not consider that Eugenics comes within the sphere of religion, is confident of the final triumph of the eugenic ideal which is, . . . "but the reasoned manifestation of a natural instinct, which has often been far more severely strained by the arbitrary prohibitions of the past than it is ever likely to be by any eugenic ideals of the future. . . . The new Saint Valentine will be a saint of science rather than of folk-lore." In another book (19) Ellis has rendered us a real service by presenting the main outline of the eugenics movement from the standpoint of one who has devoted his life to some of the deepest and most important aspects of racial welfare and racial misery.

Ellen Key (50), in her splendid appeal to Scandinavian women to awaken to the call of a new freedom, coins the word Erotoplastics, to be for her what Eugenics was to Galton. Her emphasis rests largely on the psychological side of eugenic problems and invokes the law of love in its best refinement to settle many perplexities that mankind has made for itself. Again (49) she glances at the work of others in the eugenic field long enough to show us her comprehensive sympathy thereof and then goes on to re-emphasize the Spencerian method of treating childhood and to set forth a wide program of education to fit coming generations for better parenthood than has ever been in the world before. Libraries that prudishly taboo these works because their doctrine does not in every way accord with our own American view of love and marriage do the public a great wrong. They belong in the front rank of positive eugenic literature.

David Starr Jordan, in a series of little white-bound books, has been preaching a eugenic gospel with mighty emphasis on the dysgenic horror of war, graphically elaborating Benjamin Franklin's dictum that the price of war is not paid in wartime but "the bills come later." In one (44) he proposes that "the blood of a nation determines its history" and likewise that "the history of a nation determines its blood." He shows us Napoleon's trail of blood over Europe and even to the foot of the pyramids, the mounds of skulls ploughed up and piled high by European peasants who are "chained to the wheels of toil" and are marked with slanting brow and heavy jaw because they are of an inferior stock, left to live and multiply on the fields fertilized with the blood of a better type. In another (45) he continues the thesis that war is bad and that the human harvest reaped by death in wartime is a harvest of the best the nations breed. He exaggerates the rôle of war in the making and breaking of nations, and does so purposely by harping largely on one string. " I would show the 'ugly, old, and wrinkled truth stripped clean of all the vesture that beguiles,' " he says, and has no use for those that claim an intrinsic good for war. In a more individualistic study (46) he sets forth the principles of heredity simply and lucidly, showing the bearing of biological studies on race improvement and making a mind-touching plea for all that Galton looked forward to in the broadest sense of the term Eugenics. Again, in "War and Waste" (47) he leads us over the battlefields of the world, shows us the huge war debts in figures followed by "endless caravans of ciphers" which indicate that not only have we impoverished the future biologically by the destruction of hosts of "the best that we breed" but that economically also we have, as the editor of *Life* puts it, "Long since passed the simple kindergarten stage of living beyond our means; we are now engaged in living beyond the means of generations to come." Dives, of Kipling's parable poem, Jordan thinks is none other than Baron Rotchschild and to him and the unseen empire of money-power is mortgaged the earth in payment for its armed peace, so that our young men who wish to marry and cannot because of their economic condition have farther to look than the mere cost of butter and eggs. It is a somber and dispiriting picture that is painted, and yet one cannot help feeling the truth of it and finding as potent a eugenic sermon in a battle-ship as he does in a family of Jukes. "What will be the end, no one can say. There is a steady growth of 'unrest' among the taxpayers of the world. There would be a still more violent 'unrest' if posterity could be heard from. And in its time posterity can save itself from utter ruin only by new inventions and new exploitations or by a frugality of administration of which no nation gives an example to-day."

President Hall (41) has shown us the one-ness of Eugenics and all that is best in the best religions of the world, and his words in regard to the Christian aspect are too comprehensive to be treated otherwise than by quoting as they stand:

> "The slogan of eugenics, a new religion, the religion of this world, not of another, has caught the imagination and won the applause of many who are critical if not hostile to Christianity. But why call it a new religion? Is not all of it simply a legitimate new interpretation of our Christianity? Is it not all latent in our Scriptures? Was anything more characteristic of the ancient Hebrews of Old Testament days than their purity and to keep the purity of their blood, than duties of parents to children and vice versa, and is there any trait more peculiar to the Jews in our day than that they excel all races save perhaps one in fecundity? The very covenant of Javeh with Abraham was that if he kept God's law his seed should be as the stars of heaven for multitude, as if that were indeed the chief

human felicity. This means according to the newest and highest psycho-genetic criticism simply that Jehovah's laws are at bottom those of eugenics. The supreme criterion of virtue indeed is living in every item for the interests of posterity. The world is for the chosen, the best. It belongs to those who come after us, who will be in number like the grains of sand upon the shore. That their seed fail not is the supreme blessing. The entire Old Testament from the myth of Eden to the latest prophets needs a new eugenic exegesis, while the dominant theme of the New Testament is love, the strongest thing in the soul of man, centered upon service and welfare of the race. Love and serve God and man; that is the quintessence of our religion. We only need to turn a little larger portion of the love and service we have directed toward God, who does not need it, to man who does, and we have eugenics, for who serves mankind so much as he who transmits the sacred torch of heredity, which is the most precious of all wreaths and worths, undimmed to later generations by bringing more and better men and women into the world and rearing them to the fullest possible maturity? Read in this field and you will see only what has so long lain concealed in Christianity standing forth here revealed. The beatitudes are full of it. The meek inherit the earth on the simple biological law that overindividuation is at the expense of genesis and beyond a certain point inversely as it. . . . Christianity has never said all it meant. It is not yet all revealed to man."

Positive Studies

Galton's optimism concerning the discovery of a standard of civic worth by which to measure fitness for parenthood has led some of his lesser disciples to make indiscriminate use of the term "racially fit." There is, however, an increasing number of investigators whose work has been stimulated by the pragmatic coloring of this ideal. The following samples of this pioneer work will doubtless seem to the scientific posterity of its authors much as Aristotle's "History of Animals" does to the neo-Darwinian. They are taken as typical of what might be termed the Galtonian school of investigators.

Winship (97) records 1,394 of the 1,900 descendants of Jonathan Edwards, finding among them 13 college presidents, 65 professors, 60 physicians, 100 clergymen, 75 army and navy officers, 60 prominent authors, 100 lawyers, 30 judges, 80 public officials, 3 senators, and many influential and manufacturing men.

Woods (99) collected data relative to 832 members of European royalty, graded 671 of them from 1 to 10, from feeble-mindedness to genius and found constellations of both so notable, and correlations of resemblance in character between father and son so marked, that he was led to conclude that heredity played a very important part in making up the intelligence and morality of his subjects. In intellect he found the father-son correlation to be .30 and the same in morals.

His classification and rating is arbitrary, and most of the arguments brought against Galton's "Hereditary Genius," and even more have been directed against this study, but the fact that it was made is all that concerns us here.

In "The Influence of Monarchs," Woods (100) considers the several arguments against his methods and continues to make use of much the same system of classification and analysis not only in the treatment of some 368 rulers, but of the plus or minus characteristics of the social order in the periods which fell under their influence. The work is essentially an application of biometric methods to history and to Dr. Woods it adumbrates a science of historiometry upon which the eugenist may sometime profitably draw. The correlations between the personalities of the rulers and the alterations in the material conditions of the fourteen European countries studied suggest—"That the monarchs have, to a very large extent, caused the changing conditions and not the reverse—that the monarchs have been the product of the environment in which they lived."

Woods also culled from Jameson's "Dictionary of U. S. History" and Lippincott's "Biographical Dictionary of the World" the fact that there were relationships in the cases of 13 Lees, 11 Adams', 10 Lowell's, 9 Dwights, 8 Trumbulls, 7 Livingstons, 7 Bayards, 6 Irvings, 6 Sewalls, 6 Prescotts, 5 Channings, 5 Edwards, 5 Mathers, 5 Randolphs and 5 Winthrops besides 100 other families in which from 2 to 4 noted Americans could be found related. Further, he looked into the family histories of 46 pre-eminent Americans in the Hall of Fame and found that 26 out of that number showed eminent relationships. the total being 57, a figure greatly in excess of what random expectation calls for.

The fact that a cataract of eminence seems to tumble from a single parental source, as in the case of the Jonathan Edwards group, does not satisfy the biometrician, who rightly wishes to make an exhaustive analysis of all the important elements which make up character. Shuster (86) reports an investigation in correlation between the sensitiveness of skin in adults and their parents by means of the aesthesiometer. Thus far in the study the coefficient seems to be about .29. In reaction time it has been found to be .33 for visual and .27 for auditory stimuli. These methods, like those of Thorndike (88) who found resemblances between twins by the methods of experimental psychology to be never lower than .69 and sometimes as high as .90, indicate the trend toward applying accurate measurements wherever possible instead of depending on the schedule or the questionnaire.

Following Galton's (29) suggestion as to the value of studying correlations of ability in school and university work, Schuster (86) and Miss Elderton grouped 4,000 Oxford graduates who took or failed to take their degrees between the years 1800 and 1892, and whose fathers had also been up for the degree, so that 2,459 fell into a section going back as far as 1862. This later group was made up of 149 first honor men, 329 second, 377 third, 190 fourth, 868 pass degree men and 546 that failed. Subdividing these six classes according to the nature of the degree taken by the father, the percentages where the father had taken either a first or second class degree were, respectively to the six classes: 36.2, 32.2, 29.4, 13.8, and 12.8. The coefficient of correlation for ability between father and son in this series was found to be .3 or almost a third.

A more ambitious study was made by Pearson (74) and a corps of assistants who, during a period of five years, collected data on the physical and mental characteristics of school-children and subjected it to mathematical analysis. For health, eye color, hair color, hair curliness, cephalic index, head height, head breadth and head length, the mean coefficients of correlation were, for brothers and brothers .54, sisters and sisters .53 and for brothers and sisters .51. For vivacity, assertativeness, introspection, popularity, conscientiousness, temper, ability and handwriting, the correlations were for brother and brother .52, sister and sister .51, brother and sister .52. Discrepancies, unavoidable errors, and the fact that the personal equation of the teachers who furnished the data influenced results, all taken into account, Pearson is led to conclude that mental and physical characters are inherited in the same manner and in about the same intensity. Biometrica, the official organ of the Galton laboratory, presents a series of the most elaborate statistical studies, nearly all bearing on the problem of trait-inheritance and its correlation with environmental factors. Provided the grist is good that is fed into this mathematical mill there can be little doubt but that the experts in charge of the machinery are competent to feed the multitude, hungry for eugenic loaves, with the best there is, in time.

Doctor Alexander Graham Bell (4a), whose work upon deaf-muteness will doubtless remain one of the classic studies in pioneer cacogenics is now engaged in research which promises to add a notable contribution to positive Eugenics in the near future.

Eugenic field-work, the getting material at first hand, is perhaps the most serious problem of the present day in this order of research. A great deal of the work now being done will be valuable only as the clearing a stony field of its cumbrous population is of value. The field worker must now do his or her duty in the face of the fact that there are no adequate standards to measure that which should be reported feeble-mindedness, neuropathic make-up, special or general ability, etc. Normality is a word in common use among pedigree builders—obviously a blanket term, obviously arbitrary but certainly necessary until there be a better one.

Davenport (13) has brought together in book form the main lines of eugenic research, especially those started in America. Besides the tentative list already mentioned of abnormalities that will probably be shown to mendelize, he lists the inheritance of nearly a hundred specific diseases and abnormalities as well as typical cases of heredity in qualities such as eye color, hair color and hair form, skin color, stature, musical, mechanical, calculating, literary, artistic and memory abilities. An adumbration of future geographical charting of hereditary traits, already begun in a small way, and a suggestion as to the eugenic significance of migrations add a distinctly anthropological flavor to the whole subject and bring home to one the vastness of fields hardly yet touched that await the student of one of Eugenics' many branches. A glimpse at some of the work already under way in recording the notable traits in distinctive American families should lead the intelligent reader to see the value of the humblest family pedigree, wrought out with care and patience to be added to the growing mass of data from which the analyst and statistician of the future, if not of our own generation, shall glean the principles of clear eugenic laws.

With a great part of biology, a considerable section of psychology, and an increasing number of sociologists turning heredityward there seems to be a sound foundation for the hope that the earnest investigations already under way are bringing us nearer the time when we shall have a working criterion of worth for each human strain and stock. The stamping and rating of humanity according to parental fitness is not impossible, say these workers, and just in proportion as we are led to share their faith and give them our co-operation, not without criticism, will the science of rational selection become real.

SELECTED BIBLIOGRAPHY

1. ADAMI, J. GEO. The Principles of Pathology. Phila., Lea & Febiger, 1910. 1027 p.
2. ARNER, GEO. B. L. Consanguineous Marriages in the American Population. N. Y., Columbia Univ. Press, 1908. 99 p.
3. BATESON, WM. Problems in Genetics. New Haven, Yale Univ. Press, 1913. 258 p.
4. —— ——. Biological Fact and the Structure of Society. Oxford, The Clarendon Press, 1912. 34 p.
4a. BELL, ALEXANDER GRAHAM. Upon the Formation of a Deaf Variety of the Human Race. Mem. Nat. Acad. Sci., 1883, Vol. 2, pp. 179-262.
4b. BROWN, Hon. LATHROP. On Heredity and Immigration. Congressional Record, 1914, Vol. 51, pp. 2729-2734.
5. BERTILLON, J. La Depopulation de la France. Paris, Felix Alcan, 1911. 346 p.
5a. CASTLE, COULTER, DAVENPORT, EAST, TOWER. Heredity and Eugenics. Chicago, Chicago Univ. Press, 1912. 310 p.
6. CHAMBERLAIN, A. F. Eugenics: Monroe's Encyclopedia of Educ., N. Y., Macmillan, 1911, Vol. 2, pp. 514-518.
7. CHAPPLE, W. A. The Fertility of the Unfit. Melbourne, Whitcombe & Tombs, 1903. 127 p.
8. CHURCH, WM. S. The Influence of Heredity on Disease, etc. London, Longmans, 1909. 142 p.
9. CONKLIN, E. G. Heredity and Responsibility. Sci. N. S., 1913, Vol. 37, pp. 46-55.
10. CONSTABLE, F. C. Poverty and Hereditary Genius. Lond., Fifield, 1905. 149 p.
11. DANIELSON, F. H. The Hill Folk. E. R. O. Memoir No. 1, Cold Spring Harbor, 1912. 56 p.
12. DARBISHIRE, A. D. Breeding and the Mendelian Discovery. Lond., Cassell, 1911. 278 p.
13. DAVENPORT, C. B. Heredity in Relation to Eugenics. N. Y., Henry Holt, 1911. 297 p.
14. —— ——. State Laws Limiting Marriage Selection. Cold Spring Harbor. E. R. O. Bull No. 9, 1913. 66 p.
15. DAWSON, GEO. E. The Right of the Child to be Well Born. N. Y., Funk & Wagnalls, 1912. 144 p.
16. DUGDALE, R. L. The Jukes. N. Y., Putnams, 1910. 120 p.
17. ELDERTON, E. M. Primer of Statistics. Lond., Chas. Black, 1909. 86 p.
18. —— ——. On the Measure of Resemblance of First Cousins. Lond., Eug. Lab. Memoirs, No. 4, Dulau & Co., 1907. 53 p.
19. ELLIS, HAVELOCK. The Problem of Race Regeneration. N. Y., Cassell, 1911. 70 p.
20. —— ——. The Task of Social Hygiene. Lond., Constable, 1912. 414 p.
21. —— ——. The Sterilization of the Unfit. Eug. Rev., 1910, Vol. 1, pp. 203-206.
22. ESTABROOK, A. H., and DAVENPORT, C. B. The Nam Family. E. R. O. Memoir No. 2, Cold Spring Harbor, 1912. 85 p.
23. FAIRCHILD, H. P. Immigration. N. Y., Macmillan, 1913. 455 p.
24. FÉRÉ, C. La Famille Neuropathique. Paris, Alcan, 1898, 352 pp.
25. FIELD, J. A. The Progress of Eugenics. Quart. Journ. Economics, 1911, Vol. 26, pp. 1-68.
26. FLICK, L. Eugenics. Phila., McVey, 1913. 39 p.

27. Flood, E. and Collins, M. A Study of Heredity in Epilepsy. Am. Jour. of Insanity, 1913, Vol. 69, pp. 585-603.
28. Forel, August. The Sexual Question. N. Y., Rebman, 1908. 530 p.
29. Galton, Francis. Hereditary Genius. Lond., Macmillan, 1892. (First Edition 1871). 368 p.
30. —— ——. English Men of Science. Lond., Macmillan, 1874. 270 p.
31. —— ——. Inquiries into the Human Faculty. N. Y., Macmillan, 1883. 380 p.
32. —— ——. Natural Inheritance. Lond., Macmillan, 1889. 259 p.
33. —— ——. The Possible Improvement of the Human Breed under Existing Conditions of Law and Sentiment. Nature, 1901, Vol. 64, pp. 659-665.
34. —— ——. Eugenics; its Definition, Scope and Aims. Amer. Jour. of Sociol., 1904, Vol. 10, pp. 1-6.
35. —— ——. Restrictions in Marriage and Studies in National Eugenics. Soc. Papers for 1905, Lond., Macmillan, 1906, pp. 1-49.
36. —— ——. Essays in Eugenics. Lond., Eug. Ed. Soc., 1909. 109 p.
37. —— ——. Memories of My Life. Lond., Methuen, 1908. 32 p.
38. Goddard, H. H. The Kallikak Family. N. Y., Macmillan, 1912. 117 p.
39. Grassl. Zur Frage der Fruchtfähigkeit und der Mutterschaft. Archiv. f. Rassen- u. Gesellschafts-Biologie, 1908, Vol. 5, pp. 498-525.
40. Hall, G. Stanley. Educational Problems. N. Y., Appleton, 1911. 2 vols.
41. —— ——. Eugenics. Relig. Education, 1911, Vol. 6, pp. 152-159.
42. Hobhouse, L. T. The Value and Limitations of Eugenics. Sociol. Rev., 1911, Vol. 4, pp. 282-302.
43. Hodge, C. F. Experiments on Physiol. of Alcohol. Pop. Sci. Mo., 1897, Vol. 50, pp. 594-603.
44. Jordan, David Starr. The Blood of the Nation. Bost., The Unitarian Assn. Press, 1903. 82 p.
45. —— ——. The Human Harvest. Bost., Unitarian Assn. Press, 1907. 122 p.
46. —— ——. The Heredity of Richard Roe. Bost., Am. U. Assn., 1911. 165 p.
47. —— ——. War and Waste. N. Y., Doubleday, Page & Co., 1913. 296 p.
48. Kellicott, W. E. The Social Direction of Human Evolution. London, Appleton, 1911. 249 p.
49. Key, Ellen. Love and Marriage. N. Y., Putnam, 1911. 399 p.
50. —— ——. The Century of the Child. N. Y., Putnam, 1909. 339 p.
51. Laughlin, H. H. The Behavior of the Unit-Like Series. American Breeders' Association Ann. Report, 1912, Vol. 7, pp. 304-312.
52. —— ——. Eugenics Record Office. Report No. 1. Cold Spring Harbor, 1913. 28 p.
53. McCulloch, O. C. The Tribe of Ishmael. Indianapolis, Char. Org. Soc., 1891. 8 p.
54. McDougal, Wm. A Practical Eugenic Suggestion. Sociological Papers. London, Macmillan, 1907, Vol. 3, pp. 53-104.
55. Mental Deficiency Bill. London, Wyman and Sons, 1913. 47 p.

56. Mjoen, J. A. Effect of Alcoholism on the Germ Plasm. Problems in Eugenics, 1913, Vol. 2, pp. 182-188.

57. Morel, B. A. Traité des dégenerescences physique, intellectuelles, et morales de l'espèce humaine. Paris, Balliere, 1857. 700 p.

58. Moreau, J. La psychologie morbide, etc. Paris, Victor Masson, 1859. 575 p.

59. Morrow, P. A. Social Diseases and Marriage. N. Y., Lea Bros., 1914. 400 p.

60. Mott, F. W. Heredity and Eugenics in Relation to Insanity. London, Problems in Eugenics, Eugenic Educ. Soc., 1912, Vol. 1, pp. 400-428.

61. Nearing, Scott. Race Suicide vs. Over Population. Pop. Sci. Mo., 1911, Vol. 78, pp. 81-83.

62. Nice, L. B. Comparative Studies of the Effects of Alcohol on Reproduction and Growth. Jour. of Exper. Zool., 1912, Vol. 12, pp. 133-152.

63-69. Numerous Articles in the New York Medical Journal during 1913-1914.

70. Oliver, Thos. Diseases of Occupation. Lond., Methuen, 1908. 427 p.

71. Orchansky, J. Étude sur L'Hérédité, Normal et Morbide. St. Petersburg Mem. L'Academie Imp. des Sciences, 1894, Vol. 42. 210 p.

72. Pearson, Karl. Tuberculosis, Heredity and Environment. Lond., Dulau, 1912. 46 p.

73. —— ——. National Life from the Standpoint of Science. Lond., Adam & Chas. Black, 1901. 62 p.

74. —— ——. On the Inheritance of Mental and Moral Characters in Man and Its Comparison with the Inheritance of Physical Characters. Biometrica, 1904, Vol. 3, pp. 131-190.

75. Problems in Eugenics. Papers Communicated to First Internat. Eug. Congress. Lond., Eug. Educa. Soc., 1912. 2 vols.

76. Punnett, R. C. Mendelism. Lond., Macmillan, 1911. 176 p.

77. Reid, G. A. Alcoholism, A Study in Heredity. Lond., Bailliere, 1902. 293 p.

78. Rentoul, R. R. Proposed Sterilization of Certain Mental and Physical Degenerates. Lond., Walter Scott, 1903. 26 p.

79. Report of Committee on Immigration. Amer. Breeders' Magazine, 1912, Vol. 3, pp. 249-255.

80. Ribbert, Hugo. Rassenhygiene. Bonn, Friedrich Cohen, 1910. 65 p.

81. Rosanoff, A. J. The Inheritance of the Neuropathic Constitution. Journ. Amer. Med. Assn., 1912, Vol. 58, pp. 1266-1269.

82. Saleeby, C. W. Parenthood and Race Culture. N. Y., Cassell, 1909. 331 p.

83. Smith, T. L. Some European Institutions for the Protection of Motherhood and the Prevention of Infant Mortality. Ped. Sem., 1912, Vol. 19, pp. 101-111.

84. Stockard, Chas. R. An Experimental Study of Racial Degeneration in Mammals treated with Alcohol. Arch. of Internal Medicine, 1912, Vol. 10, pp. 369-398.

85. Swift, M. I. Marriage and Race Death. N. Y., Swift, 1906. 270 p.

86. Schuster, Edgar. Eugenics. Lond., Collins, 1912. 264 p.

87. Treasury of Human Inheritance. Eug. Lab., Lond., 1912. 573 p.

88. Thorndike, E. L. Educational Psychology. N. Y., Columbia Univ. Press, 1910. 248 p.
89. Van Wagenen. Preliminary Report . . . on the Best Practical Means for Cutting off the Defective Germ Plasm from the Human Population. Problems in Eugenics, Vol. 1, pp. 460-479.
90. Von Lundborg, H. Medizinisch-biologische Familien; Forschungen innerhalb eines 2232 Köpfigen Bauerngeschlechtes in Schweden. Jena. G. Fischer, 1913. 2 vols.
91. Wallace, A. R. Social Environment and Moral Progress. Lond., Cassell, 1913. 163 p.
92. Walter, H. E. Genetics. N. Y., Macmillan, 1913. 272 p.
93. Ward, L. F. Applied Sociology. N. Y., Ginn, 1906. 384 p.
94. Weeks, D. F. and Davenport, C. B. A First Study in the Inheritance of Epilepsy. Journ, of Nerv. and Ment. Disease, 1911, Vol. 38, pp. 641-670.
95. Weeks, D. F. The Inheritance of Epilepsy. Prob. in Eug., Vol. 1, pp. 62-99.
96. Wilcox. The Statistician's Idea of Progress. Internat. Journ. of Ethics, 1913, Vol. 23, pp. 275-298.
97. Winship, A. E. Jukes-Edwards. Harrisburgh, Penn., Myers, 1900. 88 p.
98. Whetham, C. & C. D. An Introduction to Eugenics. Lond., Macmillan, 1912. 66 p.
99. Woods, F. A. Heredity in Royalty. N. Y., Holt, 1906. 312 p.
100. —— ——. The Influence of Monarchs. N. Y., Macmillan, 1913. 421 p.

Note: An extensive working bibliography of eugenics and the inheritance of mental defect is published by the New York State Board of Charities, Albany.

TUBERCULOSIS AMONG SCHOOL-CHILDREN[1]

By George E. Jones, Clark University

Introduction

Tuberculosis, like the Poor, has been with man a long time, and the characteristic of that class, Poverty, has been and is one of the most important factors in the development of the disease. Though it attacks all classes, we believe with Jenkins (40), that it is pre-eminently "a disease of poverty." "As the prevalence of tuberculosis is the index of the living, housing, working conditions in a community, (56) so the improvement of these conditions will measure the decline of the disease." Pearson (66) has shown that the death rate from consumption has declined during periods of prosperity. The consensus of opinion seems to attribute the rapid fall in the death rate of Germany to their excellent Social Insurance (22) through which the economic status of the people, as a whole, has been improved (37).

Over 2,000 years ago, Hippocrates described the 'habitus phthisicus' and recommended attention to diet and manner of living in its treatment. Galen, though he attempted to find a specific in his youth, at the age of about 70, decided there was none and prescribed plenty of dry open air with milk and eggs for food. In the 16th Century, Franciscus Sylvius described tubercles in the lungs. Bodington suggested the use of Sanatoria in 1840. Robert Koch discovered the tubercle bacilli in 1882 (74). Since this discovery, it is possible to regard tuberculosis "as a chronic infectious condition, which may present itself as a disease but not necessarily do so." (33.)

Tubercle Bacilli

The tubercle bacilli are colorless, aerobic, slightly curved, probably non-motile, unflaggelate bacteria, varying in length from 1.5μ to 4μ and in width from .2μ to .4μ. They may occur in pairs, taking the form of a 'v.' Some authors have attributed the degree of the severity of the disease to the differences in the size of the bacilli, others, to the number of bacteria present, while most consider the condition of the host, the most important factor. Once stained, these bacteria retain the color a long time, being of the ' acid proof ' group. They flourish best at the temperature of the human body though they have grown well at 60° F. They multiply by the process of fission. Some authors are inclined to think these bacilli produce spores but the evidence is very inconclusive. While man seems to form the best host for this parasite, other animals harbor it. At a certain Stock Yard, considered an average one, from 4 to 25% of the slaughtered were found infected. Milk and butter sometimes contain the organism. It is able to withstand the greatest cold we have been able to produce but 180° F. destroy it. Strong *sunshine* kills this bacterium in from one to twenty-four hours. Daylight tends to stop its growth and may kill it. Pure air lessens its vitality. (28, 46, 102.)

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[1] The author is deeply indebted to Dr. Burnham for suggesting this work and for help throughout its preparation. For the criticism and discussion of Dr. C. A. Osborne, in many phases of this subject he wishes to express his appreciation. He also owes much to the library force of the University for their assistance in collecting data.

Types of the Disease, and Parts Attacked

The parts of the body most easily affected are, the lymphatic glands, bronchi, bronchioles, lung-tissue, pleura, joints, larynx, peritoneum, organs of excretion, intestines, bones, cerebral-meninges, muscles, nerve-sheaths and blood-vessel walls. The mouth, tongue, gums and palate, though occupying an exposed position, are rarely attacked and play a very minor part as a primary avenue of infection (72). The tonsils are more often affected and may furnish a primary channel for the invasion. The pharynx and aesophagus are practically never affected. Though the stomach is sometimes infected, it is probable that the hydrochloric acid in it for the most part prevents destructive action. The intestines furnish a much greater number of the primary infections. Especially is this true of children, for intestinal susceptibility varies with age (103).

The bacteria may first appear in the surface of the lining of the bronchial tubes, extend to the submucous tissue and then enter the lungs. Or they may be taken into the alimentary tract through which they pass without making a lesion, especially during the digestion of fats, into the lacteals and thence into the circulation until they reach the lungs, where by a process of filtration, they may be retained. The bacilli may get into the circulation, grow in the kidneys, lodge in the trachea, get into cuts and abrasions, or into the alimentary tract, where they may produce ulcers of the intestines.

In general, the bovine species of tubercle bacilli, is responsible for bone and glandular tuberculosis. The human species gives rise to the pulmonary types.

The upper part of the right lung is usually first affected, then the apex of the left lung followed in order by the kidneys, joints and tendon-sheaths. The joints may swell and the patient think he has rheumatism. Some forms of pleurisy are varieties of tuberculosis. Contact tuberculosis is sometimes found among physicians and nurses. It is due to exposure while working with tuberculous patients.

Laryngeal tuberculosis may take two forms,—one mild, the other often fatal. In the first, the patient loses the power of speech, perhaps at least the vocal cords are affected. In the second the arytenoid region is affected, the patient is unable to swallow, speak well and in most cases soon dies.

Tubercular cerebral meningitis, usually found in children, has always proved fatal so far as we can find.

Of the many forms tuberculosis may take in the lungs, the chronic-ulcerative, acute and fibroid are considered the most dangerous. The so called 'galloping consumption' is found among these three. Its pace does not conform to its name. Lung tuberculosis is frequently accompanied by a middle-ear infection, the ear-drum becomes inflamed and various local troubles may be found. The mucous membrane becomes affected and soon the larynx.

Some of the diseases secondary to consumption, that is the result of it or of its attack upon the body are; skin affections, such as scrofula, forms of bone trouble, swelling of the joints, peritonitis, Bright's disease and pericarditis.

Of those having tuberculosis of the skin, joints, bones, glands, serous membrane or encysted nodules in various parts of the body, a large number recover. Especially is this true of children who have skin troubles of this nature. They generally recover and show few if any symptoms of having been afflicted.

Pulmonary patients whose tissues are practically normal, these of course including the blood, even though they may have occasional slight hemorrhages, are most likely to recover. The widespread idea that hemorrhages are fatal is unwarranted for in most cases they are not, and may be a help rather than hindrance.

Children of the age of twelve or thereabout, whose lungs are affected, may continue to have the disease and yet live to an old age. The mortality rate from 18 to 25 years of age is very high, due perhaps to the adolescent strain completing its cycle. People of from 30 to 40 years of age, who take the disease during this period, have the best chance of recovery. Their mental balance is an important factor in staying off the attack and progress of the bacilli.

CAUSES

The growth of tuberculosis in the human system is due to the *lowered vitality* of the individual (28, p. 145), (93, p. 26, 36, p. 37, 31, p. 59). " Only vital, thoroughly healthy tissue is capable of furnishing a barrier against the propagation of the infection " (79, p. 157). " The micro-organisms can not harm us so long as our organism functionates properly; they are harmless if the defensive measures of our body are in good condition " (79, p. 260). " Hence, not the tubercle bacilli should be combatted, but the deficiently functionating part of the general activity must be removed which creates the predisposition to endoparasitism " (79, p. 453). Though the writer agrees with the ideas of the author of above quotations, he sees no reasons for not reducing the number of bacteria where possible and hence thinks we should combat both, poor functionating and the bacilli.

This *lowered vitality* of the individual may be brought about by the following causes: 1, Heredity; 2, Diseases; 3, Some Occupations; 4, Starvation; 5, Fatigue; 6, Bad Air; 7, Certain Habits, and 8, Certain Mental States.

Jordan (42) believes that tuberculosis is hereditary, due to the absence of some factor or determinant in the germ-plasm which brings about a susceptibility or tendency to take the disease. For a disease to be hereditary, it *must be* or *become* part of the germ-plasm. We have no evidence that the bacilli ever fuse with the spermatazoon or ovum. Hence the disease is due to a foreign agent and not heredity (36, p. 12). From the evidence we have, we are led to the conclusion of Adami, " There is no such thing as inherited small-pox, inherited tuberculosis or hereditary syphilis " (64, p. 22, 87, p. 481-489, 55).

Landouzy and Laederick, by a series of experiments performed on dogs, rabbits, and guinea-pigs, attempted to discover whether the tubercle bacilli are transmitted from the tuberculose parents to their offspring. In the first series, they found bacilli in only one fetus. In the second, none of the dogs or rabbits were affected but 16 out of the 68 guinea-pigs showed tubercular lesions. Of the 10 offspring of the third series, but one showed a lesion. The conclusion was that tuberculosis might be contracted, though rarely, in-utero (57), (50, p. 231-3). Achard says congenital tuberculosis is only possible where the placenta is pathologically altered and that in all cases on record, the mother and child have died at or within a few weeks of the delivery (8, p. 11). So few is the number of congenital cases, this means of transmission may be practically ignored (43), (36, p. 45).

Among those who claim there is an inherited diathesis or predisposition to the disease (9), Pearson is one of the most strenuous. "It is the *all-important* genetic fact that the diathesis of pulmonary tuberculosis is *undoubtedly inherited*" (67). He thinks that infection plays a very minor part and finds that "the marriage of the actually tuberculous is less productive of evil than the marriage of those of tuberculous stock." Yet, "the bulk of the tuberculous belong to stocks which we want ab initio to discourage" (68). Hence, he recommends the regulation of marriage as the only means of getting the disease under control. "For the artizan class, the inheritance factor is far more important than the infection factor, because in a very large proportion of cases, it does not lie in the power of the individual to maintain in the stress of urban life a wholly safe environment."

Pearson uses the statistical method only. It is very doubtful whether, when thus used, it can shed much light on the nature of such a complex biological phenomenon as inheritance. His data and conclusions differ much from those of a large proportion of investigators in the same field. If he were able to give criteria whereby the tuberculous could be distinguished from the non-tuberculous stock, his statements and suggestions with reference to marriage might be properly evaluated. But since, as he states, practically every one is attacked at some time, the 'bulk' of mankind must be of tubercular stock,—a rather broad and absurd conclusion. That inheritance is the most important factor is not the logical conclusion of the fact that one may not obtain a perfect environment.

"Inasmuch, therefore, as *normal* heredity must needs have been in existence prior to *morbid* heredity (36), it is obvious, we have under discussion the heredity transmission of acquired characters derived from external causes." All biological evidence is against the modification of the germ-plasm in any such way. The "normal man is little predisposed to tuberculosis and leprosy,—" (31, p. 59, 36, p. 107). Dr. Bridge says, "The fact of his parents having had the disease, *presumes* a reduced power to resist it on the part of the individual. It *presumes* but does not prove."

What then shall be said of the part played by heredity in the Lowering of Vitality?

First, as such it has nothing to do with the transmission of the disease.

Second, congenital heredity takes place in so few cases that it may practically be ignored.

Third, anything which seriously effects the soma-plasm or germ-plasm, for good or ill, may modify the germ-plasm and by so doing give to the new organism a greater or less impetus to normal functionating and development. In this sense, then, the organism may inherit a weak mechanism but not a predisposition to the tubercle bacilli.

Because they impair normal functionating, measles, bronchitis, whooping cough, prolonged summer complaint, scarlet fever, and typhoid fever are often followed by tuberculosis. Any disease or injury may leave the body with such a reduced power of resistance that it is susceptible to the bacilli (95, p. 279, 34, 105, p. 470-1). Though the vitality of the young is greater in amount than that of the adult, it fluctuates much more and hence the occasions when the youth are susceptible to attack are more numerous.

In regard to starvation, attention needs to be called to the fact that too much as well as too little food is its cause. A surplus amount taken into the alimentary tract may prove of such a clogging tendency to the whole system as to materially lessen its ability to functionate. It would seem that although the subject of feeding is a complex one, and the conclusions of laboratory experiments conflicting, the principles involved in the feeding of cattle and stock of all kinds, since they really work in the laboratory of nature, could be applied to some degree in the feeding of men. Under the advice of a competent physician, one should take food containing the elements lacking in his constitution. Though no universal prescription can be given as to what the general public should eat, this can be given, have the food properly cooked and clean.

Coal-mining, glass-blowing, textile industries, stone-cutting, printing, painting and those occupations where there is poor air, poor light and poor sanitation are very likely to lessen vitality. Yet the important fact for the teacher and the general public is that *any* occupation may be carried on in such a manner as to make the body a hospitable habitat for the bacteria. Long hours, continuous strain, fixed position, may cause some vital organ to functionate imperfectly and thus put a strain on the whole organism.

In the school room, exacting requirements with reference to the position of the pupil in writing, standing, sitting, method of work or time given to particular tasks, may lead to a weakening of the defensive powers of the body. Play and the recess are essential parts of the curriculum. Experiments in the industrial world and in the school room have proven that frequent periods of rest promote efficiency in every way. The insistent demands upon the unstable vitality of the child account for the high death-toll of child-labor.

The presence of the fatigue toxin in the system puts an extra demand upon it and thus weakens its resistance.

The high rate of mortality, due to tuberculosis, in the teaching profession, is startling. It has been reported (96, chap. 3) that the tuberculous death rate of the teachers of Saxony exceeds that of the general public, at the ages from 20 to 29 by 60%, from 30 to 39 by 23%; of Switzerland, from 20 to 29 by 10%, from 40 to 49 by 30%. For every 1,000 dying of all causes, the following are reported as dying from tuberculosis in the province of Ontario:

"Stonecutters	650 (65.0%)	Male Teachers	99 (29.9%)
Printers	608 (60.8)	Lawyers	250 (25.0)
Female Teachers	570 (57.0)	Physicians	180 (18.0)
Seamstresses	406 (46.6)	Farmers	160 (16.0)"

"Statistics for the United States indicate a higher tuberculosis mortality for the teaching profession than for the notoriously unhealthful occupations of stone-cutter or saloon-keeper." Probably the two most important causes of this are, bad air and lack of sufficient and proper exercise in the open air. Some of the factors responsible for the bad air are: poor ventilation, too high temperature with two low humidity, and dust particles of all sorts such as must circulate where crayon and pencils are used and people live.

Lowering of vitality may arise from drug habits, alcoholism, indulgence of the passions, irregular habits of eating and sleeping, excess in the use of tobacco and articles of diet such as tea and coffee, and over-stimulation. Though most people err on the side of taking too little rather than too much exercise, it should be said that too much and too strenuous play may have the same effect as over-stimulation. For this reason, athletes, who have developed one set of muscles at the expense of another part of the body or the whole system, are more subject to this disease than those persons of spare musculature but normal organic vigor. The American ideal of specialists in sports should be discouraged for the sake of the athlete himself and for the sake of true sport. Especially is this true for the school children. The real purpose of play is to rest man, give him pleasure and promote the proper action of his whole body,—not to win medals or prizes.

For many years it has been known that the mind has much to do with health but only in recent years have physicians and laymen taken this into account in the treatment of disease. "As a man thinketh, so is he" is trite but true physically as well as morally. When one is discouraged, in trouble, grief or fear, the respiration is affected, the heart may refuse to beat normally, the glands to secrete properly and the vital organs to work at their best. Thus the invasion and growth of the bacilli is encouraged.

A wrong attitude on the part of the public has seriously interfered with the recovery of those afflicted and the lessening of the number of new cases. It has been too prone to look upon those manifestedly tuberculous, as outcasts, who should be shunned, considered pests and of degraded origin. If this is true, it is not a case for throwing stones for practically all are in the same class. Some authorities claim that from 40 to 50% of the race, not only harbor the bacteria but already have tuberculosis in some form. Dr. Cornet says. "The consumptive himself is almost harmless and only becomes dangerous through bad habits." Knopf tells us that "a clean conscientious consumptive is as safe a person to associate with as anybody" (74, 48, 104).

There is no need to be alarmed over the ubiquity of the bacilli. For while it is debatable as to whether bacteria are an unmitigated curse, it is probable that they have their proportionate share of enemies with which to contend and it is known that under favorable conditions, they, in their growth may make such an unfavorable environment for themselves that they perish (17).

We may therefore "presume for all practical purposes that the disease is always acquired from without, from bacilli taken in from the atmosphere or with food and drink." Climate, in general, has little if anything to do with the taking of the disease. It must come for the most part from human sources, possibly from milk and sometimes from butter. At the present time there is considerable difference of opinion as to whether cattle, milk and butter are major or minor sources of infection. The general conclusion of our investigation is that children are sometimes infected through the bovine bacilli and adults less often.

Symptoms

The symptoms (46, 64, 8, 9, 95, 104) of the disease do not manifest themselves early, and for this reason it is often allowed to run a long time before it receives the attention that it should. The first sign is usually a lowered vitality accompanied by a cough and slight hemorrhages. In children this cough is usually most marked in the morning. Loss of weight, strength and appetite soon follow. The digestion becomes poor, gastric discomfort takes place and diarrhoea or constipation may be present. Fever follows quickly. Rarely is there a pain in the lungs though the patient may locate it there. In this case it is in the pleura or walls of the chest or both. The temperature of the patient may rise followed by a chill. It is highest in the afternoon and evening and when it falls, the patient may perspire a variable amount. A small amount of blood in the sputum is probably more beneficial than harmful and is not to be considered dangerous.

If one lung is more affected than the other, the patient will cough more when lying on that side. As they should always avoid any but the gentlest cough, they in this case had better sleep on the opposite side. There may be vomiting. The rate of progress is usually slow but varies much. Pulmonary tuberculosis is remarkably painless. The patient becomes short-winded. There may be a wheezing or rattling sound in the chest, swallowing become difficult, the liver swell and the sexual organs become affected.

Tuberculous children are usually of a delicate build and narrow chested. They have small hearts with rapid action, feeble circulation and often abnormal throat and nasal passages. Accompanying the cough before mentioned, will be excessively bright eyes and red spots in the center of the cheeks or more often in the center of one cheek. Especially is this true at the beginning of the morning session of school. One side of the chest may expire more than the other, or one side may be sunken in more. In noticing this difference in respiration, it should be noted that all do not breathe alike. For some breathe much more with the lower part of the chest than others and this may lead to a mistake in diagnosis. In case the left lung has become contracted, we may be able to see the heart pulsate above its normal position. The expansion of the chest is always considered. It, however, is not a sure symptom for some tuberculous persons have an expansion above the average.

FREQUENCY

In an examination of school children from 13 to 14 years old, Dr. Ito (92) found 47.2% of the boys and 50.5% of the girls tuberculous. The inference has been drawn that probably one-half the Japanese school children are infected.

Harbitz (49) found 42.5% of the school children of Christiania tuberculous.

TABLE I

FREQUENCY OF TUBERCULOSIS AMONG SCHOOL CHILDREN

SECTION A.—GERMANY AND AUSTRIA-HUNGARY

Autopsies are marked a. Ages included are between vertical bars. Where datum is lacking, space is blank.

No. of Case	Bibliography	PLACE	PERCENTAGE OF TUBERCULOSIS OR LESIONS FOUND											
			Ages	4	5	6	7	8	9	10	11	12	13	14	
	97	Vienna										68			
	..	Vienna										94			
509	66	Vienna		32	52	51	61	73	71	85	93	95	94	94	53
	..	Vienna													90
	44	Prag	1st.			90						70			
	91	Prag				57						70			
	90	Dortmund													75
	..	Dortmund													50
	32	Sachsen													26
	8	Berlin													20
	97	Berlin										53.7			
	4	Berlin			54	53.1						63			
	32	Berlin			36									64	
	97	Düsseldorf													84p
	34	Düsseldorf													46
	97	Dantzic										74			

TABLE I—Continued

FREQUENCY OF TUBERCULOSIS AMONG SCHOOL CHILDREN

SECTION A.—GERMANY AND AUSTRIA-HUNGARY—Continued

Autopsies are marked a. Ages included are between vertical bars. Where datum is lacking space is blank.

No. of Case	Bibliography	PLACE	Percentage of Tuberculosis or Lesions Found											
			Ages 4	5	6	7	8	9	10	11	12	13	14	
	97	Munich									60			
1798	39										42			
	2										75			
	34	Altona												92
2594	44	Altona												53
..	..	Altona												78
	34	Altona												52
	32	Springe												29
650	35	Springe												27
496	2				61					75				
	91										53			
	105													27
	..													70
	32	Villages												22p
	..	Villages												80
2000	27												53	

	99														70
693	66	Vienna........................			17			35				55			
	..				47			57				70			
	..				36			47				51			
	..				51			71				94			
150	..	Vienna........................													21
	..	Kiel........................													20
806	..	Berlin........................													18
	..	Berlin........................													65
	..														70
	..														60
3213	86	Vienna........................a	(1st.	year to	61							50			
500	66	Munich........................a				Schoo 1 age						42			
	66	a													75
	32	Berlin........................a										65			
1800	66	a			27		27								
1820	66	a													60
	66	a			56		63					70			
88	..	a													17
93	..	Budapest........................a													69p
190	..	a													38
973	..	Prag........................a													24
401					60		64					77			

TABLE I—Continued

FREQUENCY OF TUBERCULOSIS AMONG SCHOOL CHILDREN

SECTION B.—FRANCE

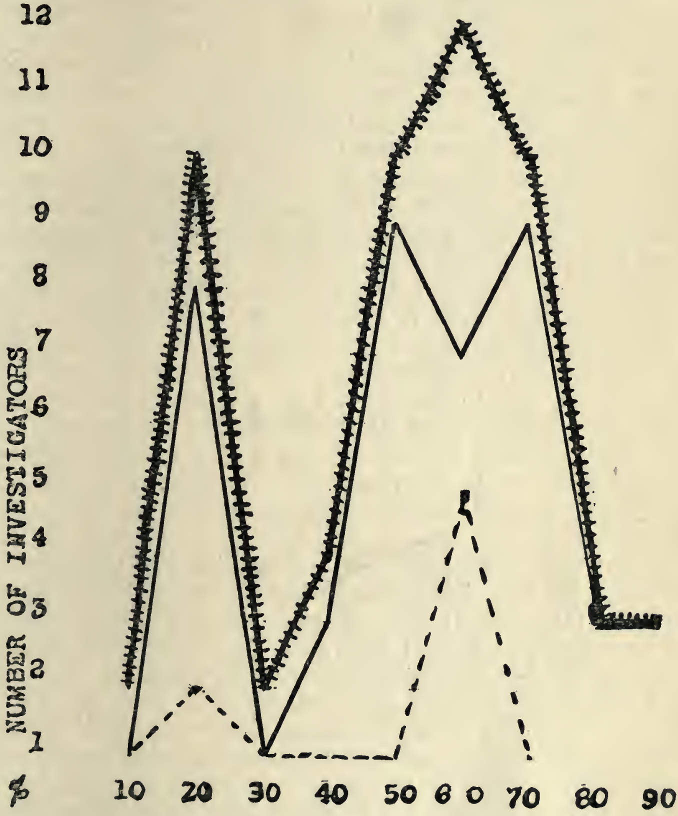
Autopsies are marked a. Ages included are between vertical bars. Where datum is lacking space is blank.

No. of Case	Bibliography	PLACE	PERCENTAGE OF TUBERCULOSIS OR LESIONS FOUND												
			Ages	4	5	6	7	8	9	10	11	12	13	14	
	44														20
	..														30
876	..														16
	77	Paris													90
685	86	Paris a	(1 year old 16%)												
327	..	Paris a	(1st. and 2nd. years 43%)												
	66	a	2nd. year to				67				64 to 16th. year				
435	86	Paris a	(2nd. year on 65%)												36
315	44	Paris													80
447	..	Paris													24

FREQUENCY

GERMANY AND AUSTRIA-HUNGARY

Curves representing the number and results, in per cent, of investigators.



————, solid black line, represents tests upon live children,—clinical, Pirquet, Moro, etc.

— — — —, dotted black line, represents the results of autopsies performed upon children.

—|—|—|—, hatched line, represents the combined results of the autopsies and the other tests.

Section B of Table I indicates, to some degree, the extent of infection among the school children of France. One author (57) finds that about 10% of the children become infected the first year and from the age of 5 to 15, 50%. This rate increases with age so that at death, practically all have been infected. The tables indicate that from 45 to 50% of the children of school age are infected. France has a very high mortality rate. Though the rate of infection increases with age, the mortality rate decreases. The clinical and the results of autopsies agree very closely.

In Germany and Austria, medical inspection in the school has reached a plane of efficiency far beyond that of any other countries investigated. The strong centralized government, with its national system of education, probably allows of a better co-ordinated and organized system of inspection than is possible in such countries as England and the United States where small sections of the country are almost autonomous in some respects. This inspection, with the co-operation of various organizations and departments, has made possible a review of the prevalence of the disease as shown in Section A of Table I. The importance (62) of the German Social Insurance Act (22) in directing attention of the public and municipalities to proper conditions of work and living can hardly be over-estimated. Discovering that most of their losses in life and money were due to tuberculosis, the people, with characteristic German thoroughness, proceeded to find how big a problem the disease was and how they might solve or simplify it. As a partial result, they have a decrease in the death rate and an increase in the working efficiency of the members.

A glance through Table I will give an idea of the prevalence of the infection. While the average of all the data obtained is 55%, the graph (see p. 75) shows that a large majority of the investigators find over 60% of the children infected.

The data for Germany and Austria-Hungary show that while few children are affected the first year, by the age of 14, practically all have become infected. This infection may be active, latent or may never develop pathological conditions. The death rate of the disease varies from 12 to 65% of the total death rate. It seems to vary inversely as the rate of infection. The fact that almost all children are infected, and that the adult disease generally has its source in a childhood infection, would tend to support the view of those who claim that tuberculosis is pre-eminently a child's disease, and would indicate that the time to fight it most successfully is at this period of life (34).

In an examination of 806 children at Brighton, England, one physician found only 3, that is .37% tuberculous. What the nature of his examination was, the writer does not know. The smallness of this percentage is remarkable. A group of investigators (72) found in autopsies performed upon 1,560 children, 18.6% with primary infection of the intestines.

To this number must be added those with primary infection of the glands, lungs, etc. Walsh (101) in an examination of 207 cases found 65 actually tuberculous and 142 pretubercular. This means that 31% were actually tuberculous and 69% in a suspicious or fit condition for the development of the disease. Squire (87, p. 373-5) after an examination of 1,680 London children, announces that the percentage of infection as ordinarily given, is too high. Here again the thoroughness of his examination is not known. He seems to think that great error arises from calling symptoms tuberculous that are not. It should be said that most physicians think the error is far more often the other way. The high death rate from this disease among children, indicates that a more thorough investigation of its frequency is needed (25). From 1900 to 1909, in London 36% of the deaths from infectious disease including tuberculosis, was due to this disease. The percentage which was 36% in the first year of life mounted to 91.8% in the 14th, and from ages 15 to 20 was 96%. Dr. M'Neil in Edinburgh, found 14.1% out of 371 children one year old and (49) 46.6% out of 170 boys from 4 to 5 years old, tuberculous.

The figures presented for England, though perhaps a little less, approximate those of other countries. Several investigators or authors are of the opinion that the percentage infected in England is given entirely too high. They however give practically no data on which they base this conclusion. Reliable statistics of actual conditions are few. England (32) has the lowest death rate from tuberculosis of all the large nations. There may be a correlation between this fact and the low percentage of infection found among school children by some. Pearson, writing in England, seems inclined to accept the results of the German investigations and to infer that infection is practically universal.

For the purpose of finding the frequency, methods of combatting and condition of tuberculosis among the school children of the United States, letters were sent to the state boards of health of every state. Thirty-four replied. No data with reference to frequency were received. Even the death statistics were conceded to be unreliable and unsatisfactory. The Boards are doing all in their power to find and put into execution a satisfactory solution of the problem but the States as such are doing practically nothing. Some of the means employed by the Boards are the issuance of bulletins and pamphlets which are placed in the hands of teachers, boards and public, lectures and traveling exhibits. Some states provide free examination of sputum. Many have required registration of tuberculous cases. Regulations regarding spitting and sanitation are reported. Almost all of these are decrees of the State Boards. Several States require special instruction on the subject of tuberculosis in the Physiology and Hygiene courses in the public schools.

Minnesota law provides that "No principal, superintendent, or teacher and no parent, master or guardian of any child or minor, having authority to prevent, shall permit any such child or minor, having . . . tuberculosis . . . to attend any public school . . ." But the *primary diagnosis* of the trouble depends entirely upon the teacher. Thus no adequate system of detection is provided and absolutely no provisions are made for the inspection of the teachers or in the preparation of them for this medical work.

One State reports that a former Governor vetoed a Bill providing for the ascertaining of the extent of the disease in that State and also that the "efforts of the Christian Scientists and an organization known as The League for Medical Freedom, have prevented thus far the operation to any satisfactory degree, of the Medical Inspection Law for School Children."

To the writer, Pennsylvania seems to have coupled with a sane law, a reasonable means for its enforcement. Applicants for a teacher's certificate must first pass a satisfactory medical examination. (School Laws, Code Sec. 1320 and 2226) Section 1509 of Code, excludes, tuberculous teachers, pupils, janitors, or any employees from any public school except such as may be carried on under the direction of the Commissioner of Health. Physiology and hygiene must include instruction in tuberculosis and be taught in all the public schools and educational institutions supported in part or wholly by the state. (Sec. 1609) Minimal amount of air space to each pupil, control of heating, lighting, ventilation and general sanitation must meet specified requirements. To accomplish these measures, a system of Medical Inspection is provided, which is made compulsory in first and second class districts and is optional in third and fourth class districts. In 1911-12 about 800 inspectors were used in the Fourth Class Districts and their report shows that they examined 145,499 children, that is about 84% of those enrolled in such districts. They found .23% tuberculous. It is not shown that any provisions have been made for taking care of those pupils and teachers found to be tuberculous. Nor is it shown whether the disease found was of the Open or Closed type.

The figures for these districts indicate that about 216 pupils should be examined per inspector and that they succeeded in examining about 182.

Another State reports that some of its County Superintendents have interested themselves in the problem of tuberculosis and have attempted to find its status. How they succeeded was not stated.

In no state, with the exception of Pennsylvania, were there any provisions made for the inspection of rural and village schools.

An attempt was made to get information from those cities supposed or reported to have medical inspection of their schools (85). Five failed to reply, nine had no data to offer on the frequency of the disease and eight gave partial reports.

Erie, Pennsylvania, reports they find .4 of 1% tuberculous and they take care of these in open-air schools.

Oakland, California, reports .1 of 1% Open and from .5 to 1% Closed tuberculosis. But as diagnosis is made only upon very strong evidences of the disease, this percentage probably fails to get a large number of the latent cases.

During the year (1912), Philadelphia had a total of 39 cases, 9 lung and 30 glandular. Besides these, they had 129 in the open-air schools who were suspiciously if not positively tuberculous. In view of the fact that examinations are made without removing clothing or taking temperature, they infer that many cases of latent tuberculosis are not diagnosed.

While presenting no figures, having careful inspection this year 1912, for the first time, Oshkosh, Wis., thinks the number of tuberculous small.

Chicago reports, " The examinations made were *necessarily* more or less *superficial* because we were not permitted to undress the children for the purpose of making a thorough physical examination nor were we permitted to take temperatures or resort to any other physical method of examination." Such data as they reported, follow:

Year	1907	1908	1909	1910	1911
Number examined	377,599	499,046	647,842	820,655	......
Number tuberculous	9	72	29	9	11

The fact that Jones' (41) investigation was only " as careful as circumstances would allow " probably accounts for the remarkably low per cent, .1 of 1%, he found, even though he limited his investigation to the pulmonary type.

Table II represents the results of investigations in various parts of the country:

TABLE II

Number Examined	Bib.		Percentage	Number t.b.
492	26	Richmond, Va., 3 and 4 grades, white.	21.0	
Not given	57	Place not given, exposed to infection through parent, etc.	20.4	
500	26	Place not given, parents tubercular	20.0	
Not given	26	Boston		5000
Not given	75	Boston, committee, found pulmonary.		133
Not given	..	Boston, committee estimated not over.		250
220	66	Boston	16.0	
Not given	26	New York City, parents tubercular	51.0	
Not given	98	St. Louis, probably should exclude		900
Not given	73	New York City, Oct.,1911, deaths, Pul. Type, cases		3 83
Not given	10	New York city, of entering clinic	45.0	
3000	41	Not given, pulmonary tuberculosis	.1	
Not given	99	Not given	45.0	
Not given	..	Not given	60.0	
Not given	..	Not given	80.0	
Not given	70	Not given before 15 years old	75.0	
Not given	86	Albany, over 6 years old	45.0	
Not given	..	Albany, over 2 years old	34.0	

A report from North Carolina (14) indicates that 85% of the people will become infected, have the disease and recover 95% will be infected or have the germs in the body during life.

FACTS BROUGHT OUT BY INVESTIGATION OF FREQUENCY IN SCHOOL CHILDREN

The data indicate that from .1 of 1% to 95% of the school children of the United States and England are tuberculous. A probable explanation of the discrepancies of the estimates follows:

Some of the investigators give no information as to the nature and extent of their inquiries. They are content to give "estimates" without their basis. Especially is this true of those who find extremely low percents. A statement that an examination of 3,000 children was "as careful as circumstances would allow," gives no idea of the value of the results. Other authors fail to make plain whether they have tested healthy or sick children or both or only the latter. And some have generalized from results they have found in those anemic or below normal. There has been no agreement in the method or character of the investigations.

The diagnosis of tuberculosis, especially the pulmonary type in its incipient stage, is difficult. The disease may be latent for years, giving no pronounced indications of its presence. The consensus of opinion is that the disease of the adult is the result of childhood infection. In view of the differences of opinion as to the interpretation of symptoms at this age, varying estimates are to be expected.

Those who found low percentages of infection, with no exception so far as could be ascertained, considered *only* pulmonary tuberculosis. As this does not manifest itself early, only serious and pronounced cases would be detected. Furthermore, the pulmonary types form but a small part of the total number of cases.

Though the glandular cases are the most numerous; they have apparently not been considered by some investigators in England and the United States. It seems well established that even pulmonary tuberculosis is due, in many cases, not to a *primary* infection of the lungs, but to a weakened condition brought about by improper functionating of *priorly* infected glands. The figures for one city show 30 cases of glandular and 9 of lung tuberculosis. That is 76.9% of the cases were of a type practically ignored by a number of English and American investigators. Were these properly investigated, there seems no doubt that the lower extreme of the estimates would have to be raised materially.

The data from the cities having medical inspection gave some interesting facts;—

In almost every city, the teacher must first examine the pupil and upon finding him ill, send or report him to the medical inspector who then makes a diagnosis.

In one city, if the parents object, the medical examination may not be made unless the principal demands it.

Another city supposed to have medical inspection, reports that it does not, but that it has five nurses to look after the health of the children. A few cities seem to depend upon nurses for diagnosis, a subject for which the nature of their training does not fit them. Thus statistics from such sources as to frequency are unreliable.

The nature of the examinations as conceded by several inspectors, did not allow of a complete diagnosis nor of a full report of the situation. They were not allowed to remove the clothes for the physical examination nor were they permitted to take the temperature. A mere look at the pupil was allowed which indicated that practically no diagnosis was made and only those pronouncedly tuberculous found.

In one city, 92 inspectors, physicians, spend three hours each school day of the ten months of school, in inspection. Each inspector has charge of 9,000 pupils. They have done the best they could. The result has been that out of 603,455 children in average attendance, but 287,871, that is 47.7% were examined during the year (59, p. 112).

These facts show that all of the children are not inspected and that those who are, receive, in most cases, a very superficial examination. Data from such sources must be unreliable and incomplete.

Mortality statistics afford no criterion of the number infected. The fact that England has a lower death rate than France does not indicate that her people are less tuberculous. Some races, the Jewish for example, seem to have developed a high degree of immunity. Other races, as the Indian and African in America, quickly succumb to the disease. Thus while the percentage of infection may be the *same,* the mortality of one is much less than that of the others. A generalization for the whole can not be made from one country, city or locality.

As has been shown, the results of autopsies and examinations made in Germany and Austria, practically agree. The same is true for France. In England and the United States, the results of autopsies indicate the number of tuberculous far in excess of the lower limits of the estimates. From the total data, it seems that the percentage is near the middle of the extremes of the tables and for the United States between 40 and 50.

More data are needed and an attempt should be made to standardize the conditions under which they are obtained.

With one exception, no effort is being made at medical inspection in the rural schools of the United States. As the rural pupils form such a large percent of the total school population, they should receive much more attention in this and other lines.

TREATMENT

Badaloni (3) claims that 'hidden,' closed tuberculosis is non-contagious and that 'open' tuberculosis is. Practically no difference is made in the treatment of the two forms.

Those consumptives having fever should not be allowed to take strenuous exercise, for this increases the fever and thereby impairs the functionating. With these patients, the condition of the mind has more to do with the progress of the disease than in those without the fever.

Feverless consumptives should exercise but never to excess. The object of this exercise is not to build muscular tissue, to make one strong or an athlete in the common acceptance of those terms, but to cause the organs to perform their functions properly. Public speaking and singing should not be indulged in by those openly tuberculous. Plenty of fresh air direct from out-doors and not through some conduit, should be taken. Windows should be open day and night, hot and cold weather. There is little reason to fear drafts (16).

Diet should receive careful attention. It has been found in the open-air schools, that it is not enough to merely furnish the schools. But, for the pupils ill-fed or not fed enough at home, it is necessary to provide food. All the children, in addition to the regular meals provided by themselves, are supplied in many schools with lunches, morning and evening.

Since leucocytes (78) are very inimical to tubercle bacilli, anything which increases the number and vigor of the former will tend to cancel the effects of the latter and to destroy them. Proper food will do this. Stale or toasted bread taken with something that will increase the flow of saliva, tender meats of almost all kinds, butter, eggs and milk are such foods. For the sick, it is better to pasteurize but not sterilize the milk. To aid in the increase of corpuscles and also in digestion, various acids are used. These should be taken only under the direction and advice of a physician. In some cases, a fruit—pineapple, for example—will take the place of this acid in digestion.

Changing climate will rarely do any good, especially if one has to return to previous environment. The chief benefit is a psychical one, for the patient is buoyed up by the hope of recovery and this, as has been shown, is a tonic in itself.

The probabilities are that cod-liver oil and similar prescriptions serve as foods, not as antidotes. Alcohol was formerly given but of late years has few advocates. To sum up, there is no universally accepted *specific*. In the search for such, numerous serums, vaccines, tuberculins and methods of administering them have been devised. The tuberculins, so far, have given the best results and have proved of great benefit in many cases. They seem to offer a suggestion as to the field of investigation for a specific (13, 12). There is little doubt of their great diagnostic value.

Probably the most used methods of administering tuberculins for diagnostic purposes are those devised by Moro, Wolff-Eisner, Calmette and von Pirquet (86).

Moro applied the tuberculin in the form of an unction to a freshly made abrasion.

Wolff-Eisner and Calmette, working separately, invented at about the same time, what is called by the former the 'conjuctival' and by the latter the 'ophthalmic' test. This consists of dropping tuberculin in the eye.

The Pirquet method, probably the most used of all, consists of making about four scarifications on some part of the body, as the forearm, leaving one scarification as a check and introducing tuberculin into the remainder (69). It is very sensitive and is very seldom followed by complications.

In all of these methods, the effect of the introduction of the tuberculin is noted, the color of the wound and the surrounding region, the nature and extent of inflammation, if any, and such other changes as may occur. From these data the diagnosis is made.

In advanced cases any or all of these tests often fail. Or where the patient is suffering from some infectious disease as scarlet fever, measles and diphtheria, negative reactions occur (58). They are of special diagnostic value in childhood.

Tuberculins are of two general types. Extract of the proteid of the tubercle bacilli combined with glycerine forms the main constituent of one type (80). In the other type living bacilli are used. Piorkowski, some years ago, inoculated turtles with the human bacilli and later took bacilli from these inoculated animals and made his tuberculin. The theory that the virulence of the bacilli is diminished by their abode in the cold-blooded animal was the basis of his work. He aimed to produce an avirulent type of the bacilli. Friedmann (1), on the basis of Piorkowski's work, experimented with tuberculin in the United States in 1912-13 but with no positively pronounced results. There is great danger in the introduction of living bacilli into a bacterium-free body of giving it the very disease (81). With tuberculins of the first type, this danger does not exist.

Many physicians are of the opinion that the final specific will be found in the field in which Piorkowski has been working.

The problem is to find a specific that will not only cure tuberculosis but will render the non-infected body immune without any deleterious effects. In the last analysis, at this time, the cure and prevention of this disease is only possible when the following are properly provided: NUTRITION, LIGHT, AIR, REST and RECREATION.

SUGGESTIONS

Thus it is seen that the fundamental problem is that of *POVERTY*. For unless it is made possible for every one to have the elements previously mentioned, there is little hope of escape or recovery from the disease. The writer is not able to offer a solution of the proper distribution of wealth. The social legislation of Germany seems to offer some suggestions.

Among the forces that may be used in a national attack upon disease in our public schools, may be mentioned, *The American Medical Association, The National Association for the Study and Prevention of Tuberculosis, The National Educational Association,* the *Census Bureau* and the *Bureau of Education.*

A concerted effort on the part of the *Medical Association* in standardizing the various tests and interpretations of symptoms, in carefully recording their cases and observations, in presenting the important facts to the public, in emphasizing the need of attacking and preventing many diseases in childhood, in demanding that medical colleges give such courses in sanitation, hygiene and children's diseases as will prepare competent medical inspectors, would be of inestimable value.

The National Association for the Study and Prevention of Tuberculosis is doing excellent work. But it is not paying enough attention to the disease at the most important period, namely, childhood. It should foster investigations in this period.

In the Department of Child Hygiene, the *National Educational Association* has an opportunity of making inquiries into such problems as that of tuberculosis among school children. It would do well to include some study of the hygiene of the teacher. This department should be one of its strongest, and part of its funds would be well spent in researches along this line.

In the taking of the census, with the usual information data as to the prevalence of diseases in the family, sanitary conditions and general health status could be obtained.

The *Bureau of Education,* since it receives reports from the whole country, should attempt to gather data regarding the condition of health in the public schools and educational institutions. For a beginning, the regular blanks sent out for superintendents, principals and heads of institutions to fill out, could be modified so as to include questions regarding the sanitary conditions of the institutions and the health of the students so far as present medical inspection allows. These reports would then be accessible to every one. This Bureau is the best agency for correlating the forces discussed. There should be mutual co-operation and co-ordination of all.

More immediate results may be expected from state-wide efforts in solving this problem. Boards of Health, including State, County, Township and City Boards, should be thoroughly organized and the work so distributed as to prevent needless duplication. A system of records, classification and plan of operation should be agreed upon. There should be the closest possible co-operation with the medical inspectors. As there is very little if any inspection of *rural* schools, it would be wise to have the members of the Township Board of Health inspect the rural and village schools of their township. For this service adequate pay should be given.

The *State Census Bureau* can perform for the state, a function similar to that outlined for the Federal Bureau and as its data are gathered in alternate periods, increase the quantity and continuity of the same.

The *State Boards of Education* should demand of all institutions preparing teachers, that they give and require of prospective teachers, special courses in physiology paying special attention to hygiene, sanitation, the general symptoms of infectious diseases and ill-health. They should require physiological instruction in the grades, consisting largely of topics on sanitation, hygiene and conditions necessary to health.

As the County Superintendent deals for the most part with the rural schools and by virtue of his visits to them knows their condition best, and also as the rural teachers, being responsible to him, can furnish him reports required, he should collect data bearing on the health conditions there.

Through the reports furnished him by the principals, superintendents and heads of educational institutions throughout the state, the State Superintendent, by use of proper blanks should be able to get at the condition of the state as a whole. He and the County Superintendents have the best opportunity for calling attention to the needs of and conditions of the *rural schools.*

Every city should have thorough inspection of its school-plant, teachers, employees, and pupils by physicians employed throughout the year, by the Board of Education. This inspection should begin at the opening of the school year and continue to its end. The inspectors should file reports of their inspections with the principals, superintendent of schools and the City Board of Health, which should co-operate with them in any way possible. In one city they do this through their nurses and their knowledge of parents and home conditions of the children. The teacher's training should be such that she is able to detect signs of ill-health in her pupils and by reporting these to the medical inspector, expedite his work. The teacher and inspector should confer with the parents, giving such advice as is necessary. And the general public should receive information as to health, not merely concerning diseases, as tuberculosis, but concerning municipal and home hygiene and sanitation. This can be given in lectures, talks, informal meetings of school patrons, leaflets, moving pictures and many other ways. Every one should have at least a knowledge of the effects of the following upon tuberculosis: Occupations, Food (kind and preparation), Bathing, Alcohol, Washing, Breathing (what and how to breathe), Sleeping, Kissing and Spitting. It should be emphasized that the last is probably the greatest factor in infection and for this reason, the individual should take care of the sputum in such a manner as to destroy it by fire or acids.

Children suffering with acute tuberculosis should be excluded from school and institutions such as sanatoria, forest schools and open-air schools should be provided for them (38). They should be separated from healthy children at home, especially in their beds.

Children with closed tuberculosis should receive special attention and continual watching on the part of the inspector and the teacher. To those about to leave school, appropriate advice in the choice of employment should be given.

Healthy children should be removed from tuberculous environment if possible and by all means during the convalescence from such diseases as measles, diphtheria, and scarlet fever. They should not be allowed to play on the floor of the house of tuberculous residents. Persons having acute tuberculosis should not work with or superintend healthy children.

This instruction of the public need not mean a scarehead campaign. It should mean just the opposite;—for a real insight into the operation of the bacilli will remove morbid fear and stimulate healthy care.

Conclusions

From this investigation and study the following conclusions are drawn:

1. Tuberculosis is *PREEMINENTLY* a disease of *CHILDHOOD,* as much so as measles, and hence like the latter should be avoided but when met should be conquered at this period.

2. More data with standardization of the conditions under which they are obtained and recorded are needed.

3. There should be publicity of the facts of tuberculosis, the status of the disease, conditions of recovery, prevention, sanitation and hygiene.

4. Teachers, from the kindergarten through the university, should be required to have and use a knowledge of the conditions of good health and symptoms of ill health.

5. For this knowledge, there should be (a) proper courses in our educational institutions, in hygiene and sanitation and (b) non-certification of teachers until they have this knowledge.

6. Greater care should be exercised in the construction of school buildings. It should be possible for practically two sides at least of a room to be almost entirely open to the air. Furthermore they should be left open, and windows too, as much as possible.

7. Better and more medical inspection of pupils and teachers is needed. The inspectors now working are doing the best they can under the conditions existing. They need help.

8. In view of the vast amount of neglect meted out to the rural pupil and teacher, more investigations of rural conditions and more medical inspection should be provided for them.

9. There is great need of proper intervals of rest, recreation and work for the pupils and teachers. Change of work may give a sense of relief and make one think himself rested but *fatigue* may remain and probably will increase. *Play* is a vital factor in health. Therefore the writer agrees with a German author who insists that "we establish plays and games, in the public schools, the teachers' institutions and the universities."

10. *OPEN-AIR SCHOOLS* are good for all kinds of children, sick and well. While the special needs of the tuberculous child demand such institutions, the normal child should be given the open air as much as possible (7). The greater freedom of the open-air school may be a factor of great significance. It seems to indicate that greater spontaneity is productive of better results, mentally and physically.

11. Proper exercise, with habituation to regular cold-water baths, is an excellent prophylactic (7).

12. General exclusion of tuberculous children, teachers or school employees is unnecessary. Those with open tuberculosis should be excluded and taken care of in separate institutions. The teacher is more dangerous as a source of infection than the pupils. Those openly tuberculous should not have charge of healthy children but should be provided for by the state.

BIBLIOGRAPHY

This bibliography contains the titles of books, articles, reports and works referred to in this thesis. In addition, leading periodicals, reports and texts of Medicine and associated sciences have been consulted. The number at the left in the references throughout the text corresponds to the same in this bibliography.

1. ACHARD, H. J., M. D. Friedmann's New Tuberculin Remedy. New York Medical Journal, Vol. XCVII, No. 8, February 15, 1913. See also Vol. XCVIII, No. 11, September 13, 1913.
2. ASCHER, LOUIS. Zur Statistic der Kindertuberkulose. Zeitschrift für Kinderheilkunde, Vierter Band, Erstes und Zweites Heft, December, 1912.
3. BADALONI, G., Prof., Dr. How the Schools Contribute to the Diffusion of Tuberculosis. International Archives für Schulhygiene, Vol. VIII, Nr. 2/3, August, 1912, pp. 314-315.
4. BAGINSKY, Dr. ADOLPH. Organization einer systematischen Bekämpfung der Tuberkulose im Kindesalter. Zeitschrift für Schulgesundheitspflege, XXXIII. Jahrgang, Nr. 8, 1910, p. 550.
5. BAKER, S. JOSEPHINE, Dr. The Division of Child Hygiene No. 4, Monograph Series, September, 1912. Department of Health, New York City.
5a. Transactions of the Eighth Annual Meeting of the National Society for the Study and Prevention of Tuberculosis, 1912. Published by Wm. F. Fell Company, Philadelphia. Valuable book of 570 pp. Following articles are found in it:
    6. BALDWIN, Dr. EDWARD R. The Diagnostic Use of Tuberculin, p. 345.
    7. BARUCH, Dr. SIMON. The External Use of Water for the Enhancing of Resistance to Tuberculosis. pp. 308-322.
    13. BROWN, Dr. LAWRASON. The Present Status of the Therapeutic Use of Tuberculin.
    24. DUNN, Dr. W. L. The Use of the Tuberculin Test.
    29. FISHER, IRVING. A Revised Estimate of the Economic Cost of Tuberculosis.
    37. HUTCHINSON, Dr. WOODS. Discussion on pages 170-171.
    40. JENKINS, Jr., JAMES. Discussion on page 174.
    56. LUDLOW, J. L. The Relation of the Layman to the Anti-Tuberculosis Campaign. pp. 60-68.
8. BILLINGS, Dr. F., and SALISBURY, J. H., Dr. General Medicine, Practical Medicine Series. Vol. 1, pp. 11-90, 1912. Year Book Publishers. Chicago.
9. —— ——. Vol. 1, pp. 1-115. Year Book Publishers. Chicago, 1913.
10. BILLINGS, JOHN S., Jr., Dr. The Tuberculous Clinics and Day Camps, No. 2. Monograph Series, July, 1912, Department of Health, New York City.
11. BRIGGS, Dr. HERMAN. Combating Tuberculosis, Care of Consumptives. Int. Congress of Hygiene and Demography. 1908, Vol. II, pp. 1061-1069. Verlag von August Hirschwald. Berlin, 1908.
12. BROWN, Dr. LAWRASON. Therapeutic Use of Tuberculin. American Journal of the Medical Sciences. Vol. CXLIV, No. 4, October, 1912. pp. 534-535.
13. See 5a.

14. Bulletin of the North Carolina State Board of Health. Vol. XXVII, No. 10, January, 1913. 22 pages. Edwards & Broughton Printing Company, Raleigh, N. C.
15. Cabot, Arthur Tracy. Tuberculosis and the Schools. Atlantic Monthly. November, 1912.
16. Carrington, Dr. T. S. Directions for Living and Sleeping in the Open Air. 24 pages. Pub. Natl. Soc. for S. & P. of Tuberculosis. New York.
17. Chapin, Dr. Charles V. Sources and Modes of Infection. John Wiley & Sons. New York, 1910. 367 pages.
18. Craig, Dr. Frank A. A Study of the Deaths from Tuberculosis in the Fifth Ward (Philadelphia) during a Period of Forty-Seven Years. American Journal of Public Health. Vol. III, No. 1. 1913. pp. 24-33.
19. Cronquist, Dr. Johan von. Erfahrungen über die Behandlung der Kindertuberkulose mit dem Köschen Alttuberkulin. Jahrbuch für Kinderheilkunde. Ser. 3, No. 25. 1912. pp. 556-580.
20. Curtis, E. W. Out-door Schools. Ped. Sem. Vol. XVI, June, 1909. pp. 169-194.
21. Daske, Dr. O. Die Tuberkulose in den Volksschulen Düsseldorf. Zeit. f. Schulgesundheitspflege, XXIII. Jahrgang, Nr. 3. 1910. pp. 197-198.
22. Dawson, W. Harbutt. Social Insurance in Germany. Pub. by T. Fisher Unwin. London, 1912. 283 pp.
23. D'Espine, Ad. Tuberculosis and the School. Int. Arch. für Schulhygiene. Vol. VIII. Nr. 2/3, August, 1912. pp. 324.
24. See under 5a.
25. Fairfield, Dr. Letitia D. A Note on Infectious Disease, Tuberculosis and Education. School Hygiene. London. Vol. III, No. 2, May, 1912. pp. 106-108.
26. Farrand, Dr. Livingston. Our Duty to the Tuberculous Child. Proceedings of the Child Conference for Research and Welfare, 2, 1910, pp. 181-186. G. E. Stechert & Co., New York.
27. Fehr, Professor. Versammlung der Tuberkulose-Artze Deutchlands. Zeit. f. Sch. g. h. pflege, XXIII Jahrgang, Nr. 10, 1910. pp. 728-729.
28. Fischer, Alfred. The Structure and Function of Bacteria. Ch. XV, XVI, and XVII. Clarendon Press. 1900. Oxford. 198 pages.
29. See under 5a.
30. Frazer, Dr. John. The Relative Prevalence of Human and Bovine Types of Tubercle Bacilli in Bone and Joint Tuberculosis Occurring in Children. Journal of Experimental Medicine. Vol. XVI, No. 4, October 1, 1912. pp. 432-441.
31. Gibson, Dr. Alexander. Practice of Medicine. Vol. 1, p. 59. Lippincott Co., Philadelphia.
32. Grotjahn, A., and Kaup, J. Handwörterbuch der socialen Hygiene. 2. Band, pp. 616-656. F. C Vogel. Leipsic, 1912.
33. Hamburger, Dr. Franz. Tuberculosis and Childhood. School Hygiene. London. Vol. III, No. 2, May, 1912. pp. 121.
34. Hillenberg, Dr. Die Verwendbarkeit der v. Pirquet-Reaktion, zur Bekämpfung der Tuberkulose in der Schule. Zt. f. Schulgesundheitspflege, XXIII, Jahrgang, Nr. 9, 1910. pp. 605-620.
35. —— ——. Zur Entstehung und Verbreitung der Tuberkulose. Zeits. f. Schulges., XXIII, Nr. 4, 1910. pp. 277-278.

36. Heredity and Disease, Proceedings of the Royal Society of Medicine. Vol. II, No. 3, January, 1909. Longmans, Green & Co., New York.

37. See under 5a.

38. Jacobs, Prof. Dr. Paul. The Preventative and Remedial Factors in the Anti-Tuberculosis Campaign. Int. Arch. f. Schulhyg. Vol. VIII, Nr. 2/3, August, 1912. pp. 318-319.

39. —— ——. Die Bekämpfung der Tuberkulose in den ländlichen Kreisen-des Reg-Bez Osnabruck. Zeits f. Schulges., XXIV, Jahrgang, Nr. 10, 1911. pp. 776.

40. See under 5a.

41. Jones, Dr. Lyman A. Prevalence of Tuberculosis among Children Employed in Factories in Berkshire County. Monthly Bulletin of the State Board of Health of Massachusetts. Vol. 6, No. 2, 1911. Boston.

42. Jordan, H. E. The Need for Genetic Study of Tuberculosis. The Journal of the American Medical Association. Vol. LIX, No. 17, October 26, 1912. pp. 1518-1519.

43. Kelynack, T. N. Children and the Anti-Tuberculosis Movement. XIVth Int. Congress of Hygiene and Demography. Vol. 4, pp. 253-255. Verlag von Hirschwald. Berlin, 1908.

44. Kerr, Dr. James. Elementary Schools and Tuberculosis. School Hygiene. London. Vol. I, 1910. pp. 14-20.

45. Kirchner, Prof. Dr. Martin. Bekämpfung der Tuberkulose, Fürsorge für Phthisiker. XIVth Int. Congress of Hygiene and Demography, 1908. Vol. 2. pp. 1027-1053.

46. Klebs, Dr. Arnold C. Tuberculosis. Appletons, New York, 1909. 939 pages (text).

47. Koch, Dr. Franz. Über die Genese und Prophylaxe der mechanischen Disposition der Lungenspitzen zur Erkrankung an tuberkuloser, Phthisis. Arch. für Rassen und Gesellschafts Biologie, 1910. Vol. 7. pp. 775-776.

48. Koch, Dr. Robert. Epidemiology of Tuberculosis. Annual Report of Smithsonian Institution, 1910. Washington, 1911. pp. 659-674.

49. Frequency of Tuberculous Infection in Children. Lancet, Vol. 1, April 13, 1912. p. 1007.

50. Landouzy, L., and Laederich, L. In Preventative Medicine. Practical Medicine Series. Vol. VIII, 1912. pp. 231-233.

51. Lapage, C. P. Cutaneous Reaction to Tuberculin in Childhood. British Journal of Children's Diseases. November, 1912, IX, No. 107. pp. 481-528.

52. Lee, Joseph. Open Air Rooms in the Boston Schools. Proceedings of the Child Conference for Research and Welfare, II, 1910. pp. 187-191. G. E. Stechert & Co., New York.

53. Lorenz, Dr. Friedrich. Die Mitwirkung der Schule in Kämpfe gegen die Tuberkulose. Zeits. f. Schulges., 23. Jahrgang, No. 8, 1910. pp. 554-555.

54. —— ——. Die Schulpraktische Arbeit an der Tuberkulosebekämpfung. Zeits. f. Schulges., 23. Jahrgang, No. 4, 1910. pp. 255-263.

55. Lucas, R. Clement. Bradshaw Lecture, December, 1911. Adlord & Son. London, 1912.

56. See under 5a.

57. Michael, Dr. May. Resumé of Work on Tuberculosis in Children for 1912. American Journal of Diseases of Children. Vol. 5, No. 2, February, 1913. Am. Medical Assn. Chicago.

58. Moltschanoff, Dr. W. J. Beobachtungen über v. Pirquets Tuberkulin reaktion bei akuten Infektionskrankheiten beim Kindern. Jahrbuch für Kindheilkunde. Ser. 3, XXV, 1912. pp. 435-451.

59. Moore, Ernest C. How New York City Administers Its Schools. pp. 112. World Book Company. New York, 1913.

60. Nietner, Prof. Dr. Die Bekämpfung der Tuberkulose unter Schulkindern. Int. Arch. f. Schulhyg. Vol. VIII, Nr. 4, November, 1912. pp. 461-476.

61. —— ——. Die Tuberkulose in Kindesalter und ihre Bekämpfung in Hause und Schule. Zeits. f. Schulges., 1910, XXIII, Jahrgang, No. 10. p. 741.

62. —— ——, and Lorenz, Dr. F. Das Wesen der Tuberkulose als Volkskrankheit und ihre Bekämpfung durch die Schule. Zeits. f. Schulges. 1910, 23 Jahrgang, Nr. 1, 62-64.

63. Orth, Dr. J. Importance of Bovine Bacilli for Human Beings. Extract from Berliner klinische Wochenschr., March 10, L., No. 10, in The Journal of the Am. Medical Assn., April, 1913. Vol. LX, No. 16. pp. 1267.

64. Osler, Dr. Wm., and McCrea, Dr. T. A System of Medicine. Vol. I, page 22. Oxford Med. Publications, 1907.

65. Otis, Dr. Edward O. Institution for the Prevention and Cure of Tuberculosis. Int. Arch. für Schulhyg. Vol. VIII, Nr. 2/3, August, 1912. pp. 319.

66. Pearson, Karl. The Fight Against Tuberculosis and the Death Rate from Phthisis. Dulau and Co., Ltd. London, 1911. 35 pages.

67. —— ——, and Others. Draper Company Research Memoirs. II, A First Study of the Statistics of Pulmonary Tuberculosis. 1907. III, A Second Study—Marital Infection. 1908. VI, A Third Study—Mortality of Tuberculose and Sanatorium Treatment. 1910. VIII, A Fourth Study. 1913. Dulau & Co., Ltd. London.

68. —— ——. Tuberculosis, Heredity and Environment. Dulau & Co., Ltd. London. 46 pages. 1912.

69. Pirquet, Clemens von. Frequency of Tuberculosis in Childhood. Jr. of Am. Med. Assn., No. 9, Vol. LII, February 27, 1909. pp. 675-678.

70. Pottenger, Dr. Francis Marion. The Relationship Between the Infection in the Child and the Clinical Tuberculosis in the Adult. Am. Journal of Diseases of Children. Vol. 4, No. 1, July, 1912.

71. Public School Messenger. Vol. X, No. 3, January, 1912. Official Publication of the Department of Instruction. St. Louis, Mo.

72. Ravenal, Dr. Mazyck P. Infection through Food and Contact. XIVth Int. Cong. Hygiene and Demography. Vol. 2, 1908. pp. 29-41. Hirschwald. Berlin, 1908.

73. The Registration and Sanitary Supervision of Pulmonary Tuberculosis in New York City. No. 1, Monograph Series, February, 1912. Department of Health, New York City.

74. Reports of the Tuberculosis Commissions of Health, 1902-04, and 1906 State Board of Health. Baltimore, Md.

75. Report of Committee of Boston Assn. for Relief and Control of Tuberculosis. Geo. S. C. Badger, Chairman, November, 1912.

76. Annual Report of the Pasadena City Schools. Pasadena, June 30, 1912.

77. Ricker, Dr. A. J. The Rôle Played by Resistance in Pulmonary Tuberculosis. Medical Record. Vol. 82, No. 17, October 26, 1912. pp. 783.

78. Ringer, Paul H. Further Study of the Prognostic Value of Arneths Leukocytic Blood Pictures in the Diagnosis of Pulmonary Tuberculosis. Am. Jr. of the Medical Sciences. Vol. CXLIV, No. 4, October, 1912.

79. Rosenbach, Dr., Prof. O. Physician versus Bacteriologist. Chap. XIII, XVIII, XXVI. Funk and Wagnalls, 1904.

80. Ruck, Dr. Karl von. A Practical Method of Prophylactic Immunization against Tuberculosis. Medical Record. Vol. 82, No. 9, August 31, 1913.

81. —— ——. The Relative Value of Living and Dead Tubercle Bacilli and of their Endotoxins in Solution in Active Immunization against Tuberculosis. Med. Record. Vol. 83, No. 12, March 22, 1913.

82. Ruttman, W. F. Schulhygiene für Pädägogen. Bayreuth, 1912.

83. Schloszman, Dr., Prof. A., and Monti and Hamburger. Die Tuberkulosehaufigheit im Kindesalter. Arch. für Rassen-und Gesellschafts-Biologie, 1909. Vol. 6. pp. 407.

84. Schmidt, Dr. Die Tuberkulose bei Volksschullehrern. Zeits. für Schulges., 1910, XXIII, Jahrgang, No. 4. pp. 278-279.

85. Shafer, George H. Health Inspection of Schools in the United States. Ped. Sem. Vol. XVIII, No. 3, September, 1911. pp. 273-314.

86. Shaw, Dr. Henry, and Laird, Dr. A. The Diagnosis of Tuberculosis in Young Children. Archives of Pediatrics. Vol. 29, July, 1909. pp. 481-489.

87. Squire, J. E. The Incidence of Tuberculosis in Children with Special Reference to School Attendance. Lancet. Vol. II, August 6, 1910. pp. 373-375.

88. Steenhoff, Dr. G. The State of Health in the Infant and Elementary School Teachers of Sweden. Arch. f. Schulhyg. Vol. 7, 1911. p. 565.

89. Steinhaeuser, R. J. The Control of Tuberculosis as Practiced in the County Town of Lewes. Journal of the Royal Sanitary Institute. Vol. XXXIII, No. 11, December, 1912. pp. 535-537.

90. Steinhaus, Dr. F. Beobachtung über die Tuberculosehäufigkeit an Dortmunder Volksschulkindern im Schuljahre, 1906-7. Zeits. f. Schulges., XXIII, Jahrgang, Nr. 4, 1910. pp. 275-277.

91. Stephani, Dr. Die Mitwirkung der Schularzte bei der Tuberkulosebekämpfung. Zeits. f. Schulges., XXIII, Jahrgang, Nr. 4, 1910. p. 241.

92. —— ——. Über die Haufigkeit der Tuberkulose bei Schulkinder. Zeits. f. Schulges., XXIV, Jahrgang, Nr. 7, 1911. pp. 541-542.

93. Stenberg, Dr. G. M. Infection and Immunity, page 26 (text). John Murry. London, 1913.

94. —— ——. A Manual of Bacteriology. Ch. XI, pp. 374-392. William Wood & Company, New York.

95. Strumpell, Dr. Adolph v. Textbook of Medicine. Vol. I, page 279. 4th American Edition. D. Appleton & Company, New York.

96. Terman, Lewis M., Ph.D. The Teacher's Health. Ch. III. Houghton Mifflin Company, 1913. 132 pages.

97. Tuberculosis in School Children. School Hygiene. London. Vol. II, No. 6, June, 1911. p. 348.

98. Two Years' Work by the St. Louis Society for the Relief and Prevention of Tuberculosis, 1910-11. Board of Education Building, St. Louis, Mo.

99. Wachenheim, Dr. F. L. The Diagnostic Value of the Cutaneous Tuberculin Test of von Pirquet. Am. Jr. of Children's Diseases. Vol. 4, No. 1, July, 1912, page 26.

100. —— ——. Notes on Tuberculosis in School Children. Proceedings of the Child Conference for Research and Welfare, I, 1909. G. E. Stechert & Co., New York. pp. 65-72.

101. Walsh, Dr. S. B. The Treatment of Tuberculosis in School Children. School Hygiene. London. Vol. II, No. 10, October, 1911. pp. 589-592.

102. Weinzirl, John. The Action of Sunlight upon Bacteria with Special Reference to Bacilli of Tuberculosis. Reprint from Jr. of Infectious Diseases, 1907.

103. Weleminsky, Friedrich. The Ways of Entrance and the Diffusion of the Tubercle Bacilli in the Organism. Int. Arch. f. Sch. hg. Vol. VIII, Nr. 2/3, August, 1912, pp. 333.

104. Wimmenhauer, Dr. Paul. Über Tuberkulinimpfungen nach von Pirquet bei Schulkindern. Zeits. f. Schulges., 25 Jahrgang, No. 4, 1912, pp. 245-264.

105. —— ——. Über die Beziehungen des Gebiesse zum Ernahrungszustand bei Schulkindern. Zeits. f. Schulges., XXIII, Jahrgang, Nr. 7, 1910, pp. 470-471.

106. Zibell, Dr. Die im Preuszen gegen Verbreitung der Tuberkulose in den Jahren 1903 bis 1908, getroffenen Masztnahmen. Zeitschrift für Schulgesundheitspflege, VIII Jahrgang, Nr. 9, 1910, p. 742.

THE DEVELOPMENT OF A CHILD'S VOCABULARY

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Introduction

The child whose speech has provided the materials for the present study was born in a small village 3 or 4 miles south of Glasgow, Scotland, on May 28th, 1909. Up to the beginning of the fifth year, when the last observations here recorded were made, she had received very little direct education, but every opportunity had been taken to make her acquainted with the more interesting facts of town and country life. In particular, special attention had been paid to her speech. Baby words and idioms were avoided from the first and care was taken to speak to her in language as concrete and specific as possible. For her part, she responded readily to this indirect training in good speech. By the end of the third year, she had acquired the habit of picking out unfamiliar words, asking their meaning, and thereafter using them frequently until she had mastered them; and by the end of the fourth year, there was evident a nascent feeling for words, showing itself occasionally in a desire for right rhythm and correct usage.

The first words used by her with unmistakable reference to the facts of experience were "dog" and "dada," which were uttered frequently by her in the first week of the 11th month. Explicit predication through the conjunction of a noun and a verb or adjective began in the first fortnight of the 17th month with a few phrases like "bell ring," "leaves fall" and one three word sentence "Isa do it." The vocabulary recorded during the fortnight consisted of 109 nouns, 30 verbs, 1 pronoun, 8 adjectives, and 8 adverbs (see below). Comparison with corresponding lists in Tracy (*Psychology of Childhood,* p. 140 seq.) suggests a certain precocity in the capacity for verbal expression, and this is still more marked in the character and extent of the vocabulary in use at the end of the second year. But apart from a quickness of mind of which this is the most obvious indication, the child is not and has not been generally precocious. In some respects (for example, in the naming of colors, in number, in tune) she is rather behind what seems to be the average of intelligent children than ahead.

By the 20th month, her speech though still very imperfect and characterised by many peculiarities of idiom showed a distinct approximation to normal speech. With a view to studying the sentence structure at this stage,[1] I made a collection of her utterances during the last week of this month, noting down all the sentences I could, and only rejecting a few which were meaningless or mere echoes of what other people said. I did this again in the last week of each month up to the end of the 2nd year, and accumulated altogether 1,240 sentences. Before the end of the third year came, it had occurred to me that I had in these sentences valuable material for the study of the child's working vocabulary, and to follow out the development of speech forms I gathered 1,250 sentences in the same manner in the last fortnight of the 36th month. Then two months later, after I had had time to work through these, I made the vocabulary contained in these sentences the starting point for the compilation of the child's complete vocabulary. At the end of the fourth year I repeated what I had done the year before: collected 1,250 sentences in the last fortnight of the 48th month, and recorded the complete vocabulary two months after. On the two occasions, it should be added, care was taken to make the collection of sentences over as wide a field of experiences as possible, and yet to reproduce certain typical situations. Both years, sentences were got at all times of the day, at home, in the garden, on a country walk, during a train journey, on a visit to town. The sentences at the end of the second year were collected under rather different conditions. Besides being spread over a longer period, they were mainly got in and around the home. The life of a two-year-old child is necessarily more restricted than that of the three- or four-year-old, and the difference is reflected in the vocabulary.

The Vocabulary at 17 Months

Before proceeding to an examination and analysis of the vocabularies at 2, 3, and 4, I give the vocabulary at 17 months, arranged in word groups similar to those employed for the later ages. In the nature of the case it is rather difficult to fit distinctions either of form or content, which are proper to developed speech, to rudimentary sentences of one or two words. Words like "Down" or "Away" (meaning "Put it down" and "He has gone away") are not strictly adverbs in this usage, though containing the adverbial idea. The adjective in some cases, perhaps in all, is not really an adjective, but an inseparable part of a substantive; and a word like "Burn" uttered with emotional emphasis at the sight of a teapot, which one classifies as a verb, is really as much an adjective as a verb. But partly because most of the words in common use at this stage are exceedingly simple in connotation, partly because even the most complex in implication develop into sentence elements comparatively soon, it is permissible to employ the ordinary categories for them for purposes of comparison with later speech.

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[1] I have discussed this in an article on "The Beginnings of Syntactial Speech," in *Child Study* (London), March and April, 1913.

NOUNS (109)—

1. *Body:* cheek, ear, foot, hand, leg, nail, neck, nose, teeth, toe.
2. *Food:* biscuit, bread-and-butter, drink, egg, fish, granose, jam, milk, porridge, potatoes, strawberry, sugar, sweetie, tea.
3. *Dress:* blanket, bonnet, boot, clothes, dress, feeder, gown, hat, hood, jersey, napkin, pin, petticoat, sash, shoes, socks, stockings.
4. *Household, etc.:* (a) bag, bath, bell, bottle, box, brush, chair, clock, coal, comb, gas, matches, powder, ring, soap, sponge, spoon, water. (b) penny, purse, ticket, watch.
5. *Topography:* sea.
6. *Locomotion:* car, pram, train.
7. *Animals:* bear, bird, cat, cow, dog, horse, sheep. 3 particular dogs.
8. *Plants:* daisy, flower, grass, leaf.
9. *Play:* (a) dolly, pail, shell, spade, stick. (b) book, letter, paper, pencil, (postal) card.
10. *Time:* noon.
11. *People, etc.:* aunt, baby, boy, daddy, darling, girl, grandpa, lady, mamma, man, post(man). 2 adults and 3 children.

PRONOUN (1)—it.

ADJECTIVES (8)—bad, dear, dirty, fat, good, more, poor, sweet (caught, done).

VERBS (30)—bring, burn, carry, catch, clap, come, cut, do, dry, fall, get, go, kick, kiss, knit, look, meet, open, pull, push, ring, shut, sit, sleep, speak, sweep, tickle, wag, warm, wash.

ADVERBS, ETC. (8)—away, down, now, up. No, yes. Thank you, good-by.

Among the nouns (which constitute 70% of the list), it will be noted that words denoting the objects of the child's immediate environment—parts of the body, articles of food and clothing, household articles of personal utility—figure largely. So also do the names of animals, and still more of people. But more remote facts are scantily represented: there are few words relating to the house, the neighborhood or locomotion. There is however, rather unexpectedly, a time word ("noon") and a quantitative expression ("more"). Verbs denoting for the most part actions that concern the child make up 19% of the list, a proportion not far short of that normal from 2 to 4. The adjectives and adverbs, as has already been indicated, are somewhat exceptional in character. The process of detaching attributes from nouns, and modes from verbs, is still rudimentary; and adjectives are as yet bound up with nouns or are used for them, and adverbs generally function as verbs. It is worthy of note that the moral epithets "good" and "bad" appear on the meagre list of adjectives, and that there are no less than 3 adverbs of place.

THE WORKING VOCABULARY FROM TWO TO FOUR

A mere list of the words known and used by a child at any particular age has only a limited value as an index of mental content. On such a list, words common and uncommon, fundamental and accidental, stand together without distinction; and the proportions of the different elements of a sentence (say of nouns and verbs, or verbs and adverbs) are completely different from what they are in actual speech. To get a more intimate knowledge of the actual words used by the child, we must employ the statistical method of samples and examine the words found in a sufficiently large number of typical sentences. Following this course, I have taken the sentences collected at 2, 3 and 4, and sought by proper arrangement and classification to bring out their significance as an expression of the mental development of the child. This method, it need scarcely be said, does not give the whole vocabulary but it gives a considerable proportion of it. At 3, the words included in the collected sentences make up 58% of the total vocabulary. At 4, they make up 40%. Moreover, for any lack of completeness, there is ample compensation in the representative character of the words under examination. Even allowing for accidental variations owing to unavoidable differences in the conditions under which the collections were made, the chances are that any particular group of words though not appearing in full strength will appear in more or less proportionate strength, and the larger the groups the more exact will the proportion be. And if we count the total words used instead of reckoning each word only once, as we must do if we content ourselves with a list made in dictionary fashion, we may hope to get a still more precise measure of the varying importance of the different interests represented by the words.

The best justification of the method is its results. I proceed, therefore, to give the lists of words in use at the three ages under consideration, arranged in groups, with a statement of the whole number of the words used in each group.[2] Thereafter, I shall try to indicate the more important implications in some detail.

NOUNS

Vocabulary: II, 323, III, 418, IV, 435.
Total Words: II, 1,528, III, 1,283, IV, 1,289.

1. *Body:*

II: V. = 19; T. W. = 69.
Arm, bosom, brow, cheek, chin, eye, face, feet, finger, hair, hand, knee, leg, mouth, nose, skin, tear, thumb, toe.
III: V. = 30; T. W. = 104.
Arm, back, body, cheek, chin, curl, ear, elbow, eye, face, finger, foot, hair, hand, head, heart, knee, lap, leg, mouth, nose, shoulder, skin, stomach, sweat, tail, tipheels, throat, toe, tongue.
IV: V. = 33; T. W. = 105.
Arm, back, blood, bottom, breast, brow, cheek, chin, crown, curl, elbow, eye, face, finger, foot, hair, hand, heel, knee, leg, lip, mark, mouth, nail, neck, nipples, nose, skin, stomach, tail, throat, toe, tooth.

1a. *Health:*

II: V. = 2; T. W. = 2.
Sanatogen, Magnesia.
III: V. = 6; T. W. = 8.
Burn, chill, measles, rickets, Cod liver oil, Formamint.
IV: V. = 7; T. W. = 13.
Cold, hiccough, operation, Castor oil, Formamint, Health salts, Rebeleine.

2. *Food:*

II: V. = 33; T. W. = 153.
Biscuit, bread, bun, butter, bone, cake, cakeoma, chocolate, corn flour, cream, crumbs, drink, egg,

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[2] NOTE: Throughout the lists, V. denotes the actual vocabulary in which each word is counted only once: T. W., the Total Words, every word being counted as often as it is used. Roman numerals, II., III., and IV., indicate age.

fish, flour, grape nuts, jelly, juice, lemonade, milk, porridge, potato, prune, pudding, salt, saps, scone, sponge-cake, sugar, sweetie. Breakfast, dinner, supper.

III: V. = 32; T. W. = 76.

Allenbury's, Benger's, biscuit, bite, bone, bread, bread crumbs, cake, chocolate, chop, cocoa, crumbs, custard, egg, food, gravy, lime juice, meat, milk, mustard, pie, plum, porridge, potato, salt, scone, scoot, semelina, soup, sugar, tea, water. Dinner.

IV: V. = 28; T. W. = 77.

Banana, bread, bun, butter, cake, cream, curds, drink, egg, food, gravy, gristle, juice, lemon, lemonade, meat, milk, mince, potato, scrapings, sip, soda-water, soup, tea, water. Breakfast, dinner, grace.

3. *Dress:*

II: V. = 31; T. W. = 79.

Apron, binder, boot, button, clothes, coat, combinations, dress, feeder, gloves, gown, handkerchief, hat, knickers, muff, muffler, napkin, petticoat, pinafore, rabbit bonnet, ribbon, safety-pin, sash, semmit, shoe, skirt, slipper, stocking, tie, waterproof. Flannel.

III: V. = 34; T. W. = 75.

Apron, band, blanket, blouse, boot, bow, brooch, button, clothes, coat, comb, combinations, dress, frock, glove, golosh, hairpin, hanky, hat, hook, nightgown, petticoat, pocket, safety-pin, shoe, sleeve, slipper, skirt, sock, stocking, suspender, underskirt. Linen, wool.

IV: V. = 34; T. W. = 86.

Binder, bonnet, boot, bow, clasp, clothes, coat, dress, dressing-gown, eye, garter, glove, hanky, hat, hole, hook, knickers, I, napkin, petticoat, pocket, ribbon, sash, shawl, shield, shoe, sleeve, stocking, suspender, tie. Lace, silk, stitch, thread.

4a. *Personal Belongings:*

II: V. = 8; T. W. = 17.

Cigarette, fountain pen, money, pipe, purse, ring, specs, watch.

III: V. = 4; T. W. = 5.

Money, penny, purse, thimble.

IV: V. = 9; T. W. = 18.

Case, cigarette, glasses, photograph, pipe, scent, teat, umbrella, watch.

4b. *Domestic Articles:*

II: V. = 50; T. W. = 187.

Bag, bath, bed, bedcover, bell, blanket, box, brush, chair, clock, couch, cover, cradle, cup, drawer, egg-spoon, fire, fork, gas, glass, gum, hob, inchtape, iron, jug, lid, machine, mat, milkcan, paint, pan, parcel, Pears' soap, piano, pillow, plate, plug, saucer, shaving soap, sheet, soap, spade, sponge, spoon, table, table-cover, tea-cosy, tumbler, water, water-can.

III: V. = 45; T. W. = 98.

Bar, basket, bath, bed, bedcover, bottle, bowl, bundle, chair, china, clothes-basket, couch, cup, deck-chair, dirt, dust, duster, fire, fork, glass, gramophone, iron, ironing, lid, mess, mirror, nail, parcel, pillow, pin, plate, pot, red-stone, rope, seat, soap, soot, sponge, spoon, table, table-cover, tongs, tray, tumbler, vase.

IV: V. = 52; T. W. = 126.

Bag, basket, bed, bed-clothes, bell, bottle, bowl, box, brush, cage, chair, clock, coal, cork, cream-jug, cup, deck-chair, dirt, dish, dust, electricity, glass, hammer, jar, knot, lamp, light, mess, mirror, nail, pillow, ring, scissors, screen, screw, seat, siphon, soap, stool, string, table, tin, tumbler, vase, wheel, wire. Click, fork, plate, smoke, soot, spoon.

5. *House:*

II: V. = 15; T. W. = 43.

Blind, drawing-room, floor, garden, garden-wall, handle, house, kitchen, mantelpiece, parlor, room, study, wall, window.

III: V. = 18; T. W. = 48.

Blind, chimney, dining-room, door, garden, house, kitchen, oven, press, rack, rookery, roof, room, stair, steps, stove, wall, window.

IV: V. = 17; T. W. = 58.

Baluster, bedroom, cupboard, door, fire, floor, frame, garden, green, house, kitchen, oven, press, room, shelf, stair, window.

6. *Topography:*

II: V. = 10; T. W. = 16.

Bridge, gate, place, pole, road, sea, village, wood, wave. Stone.

III: V. = 27; T. W. = 59.
Bank, bridge, drain, east, field, hedge, hill, mountain, park, pipe, place, pole, pool, quarry, road, sea, shore, street, town, trough, village, water, wood. Chuckies, mud, sand, stone, tar.
IV: V. = 28; T. W. = 86.
Bank, bonfire, bridge, burn, canal, field, flag, golf course, line, park, paling, place, railway, road, signal, snow drift, station, street, tunnel, underground, village, way, well, wood. Mud, stone, tar.

6a. *Particular Places:*
II: V. = 2; T. W. = 4.
A town, a house.
III: V. = 12; T. W. = 14.
1 house, 2 streets, 7 towns, 2 other places.
IV: V. = 12; T. W. = 19.
2 rivers, 3 streets, 7 towns.

7. *Meteorology:*
II: V. = 7; T. W. = 17.
Cold, draught, rain, shadow, snow, sun, wind.
III: V. = 6; T. W. = 11.
Air, cold, rain, sunshine, weather, wind.
IV: V. = 9; T. W. = 13.
Air, dark, draught, heat, moon, rain, snow, sun, wind.

8. *Locomotion:*
II: V. = 6; T. W. = 32.
Barrow, boat, carriage, engine, train, walk.
III: V. = 10; T. W. = 19.
Boat, cart, motor car, train. Picnic, race, ride, sail, trip, walk.
IV: V. = 9; T. W. = 29.
Barge, bicycle, boat, car, cart, engine, pram, train, walk.

9. *Animals:*
II: V. = 25; T. W. = 70.
Bird, buckie, calf, chicken, cock, cow, dicky-bird, dog, duck, goose, hen, horse, lamb, moose, mouse, parrot, pigeon, pony, puppy, pussy, swan, worm. Claw, fur, paw.
III: V. = 30; T. W. = 79.
Bear, beast, bee, bird, bluebottle fly, cat, chicken, cow, crow, dog, fish, fly, foal, hen, horse, insect, lion, mongoose, moth, mouse, pig, swan, wasp, worm. Beak, droppings, feather, nest, sting, wing.

IV: V. = 25; T. W. = 75.
Animal, beast, bird, cat, chicken, cow, daddy-long-legs, dog, duck, fish, fox, goat, guineapig, hen, horse, lion, pussy, rabbit, robin, sheep, swan, tadpole. Beak, claw, feather.

9a. *Particular Animals:*

II: V. = 8; T. W. = 52.
1 bird, 1 cat, 6 dogs.
III: V. = 7; T. W. = 19.
7 dogs.
IV: V. = 2; T. W. = 2.
2 dogs.

10. *Plants:*

II: V. = 6; T. W. = 17.
Daisy, lily, moss, tree. Flower, leaf.
III: V. = 18; T. W. = 32.
Daisy, dandelion, grass, monkey puzzle, nettle, pansy, plant, poppy, rose, tulip, violet, wallflower. Blossom, bud, bunch, flower, stalk, tree.
IV: V. = 19; T. W. = 43.
Balm, broom, carnation, grass, lily, lily of the valley, polyanthus, 'puff-puff,' rose, tulip, whin. Bud, bunch, leaf, flower, petal, seed, stem, thorn.

11. *Play and Occupations:*

II: V. = 24; T. W. = 93.
Ball, bool, brick, bubble, castle, doll, game, half-circle pillar, toy, shell, splash, toybox. Book, ink-bottle, lead-pencil, lesson, letter, paper, pencil, post-card, prize, rubber, writing.
III: V. = 22; T. W. = 104.
Ball, bead, blindman's buff, bricks, doll, game, golf-ball, jingo-ring, ninepins, pail, pram, skipping-rope, squeal, story, string, swing, tig, wheel. Book, paper, picture, present.
IV: V. = 22; T. W. = 57.
Ball, bead, bubble, crook, doll, exercise, game, mouth-harmonium, singing, song, stick, story, swing. Lesson, page, paper, pencil, picture, poetry, prize, reading, work.

11a. *Particular Dolls:*

II: V. = 4; T. W. = 27.
III: V. = 8; T. W. = 18.
IV: V. = 4; T. W. = 16.

11b. *Personal Experiences:*

II: V. = 10; T. W. = 19.

Dip, kiss, pain, shave, sleep, smell, smoke, rest, talk, whackie.

III: V. = 12; T. W. = 16.

Carry, clap, dream, fright, hush, kiss, knock, pain, rest, sleep, smell, whacking.

IV: V. = 9; T. W. = 17.

Carry, jumping, fright, prick, rest, sleep, smell, taste, trouble.

12a. *Time:*

II: V. = 4; T. W. = 10.

Afternoon, day, minute, time.

III: V. = 11; T. W. = 39.

Afternoon, birthday, day, holiday, minute, morning, night, summer, Sunday, time, year.

IV: V. = 14; T. W. = 69.

Afternoon, birthday, day, half-an-hour, hour, minute, morning, night, Saturday, summer, Sunday, time, while, winter.

12b. *Quantity:*

II: V. = 3; T. W. = 23.

Bit, drop, pair.

III: V. = 7; T. W. = 36.

Bit, drop, hundreds, lot, rest, sprinkle, swarm.

IV: V. = 17; T. W. = 55.

Bit, boxful, cupful, drop, grain, half, half-a-dozen, load, lot, lump, pair, piece, pound, scrap, strip, tinful, tumblerful.

12c. *Position:*

II: V. = 1; T. W. = 1.

Corner.

III: V. = 5; T. W. = 11.

End, front, middle, side, top.

IV: V. = 6; T. W. = 12.

Corner, end, front, middle, side, top.

13. *People:*

II: V. = 24; T. W. = 279.

Aunt, baby, boy, daddy, dancer, daughter, father, girl, gentleman, grandma, grandpa, lady, love, mamma, man, mother, queen, weenie. Coalman, grocer, milkgirl, postman, shepherd, shoplady.

III: V. = 30; T. W. = 278.

Baby, boy, children, crowd, daddy, fondling, friend, girl, grandma, infant, lady, mamma, man, mother, people, sister, sweetheart, 'tiny.' Conductor, doctor, farmer, ironman, milkgirl, painter, plantman, policeman, postman, post office lady, sweep, workman.

IV: V. = 25; T. W. = 184.

Baby, boy, brother, children, daddy, dearie, elf, fairy, father, grandma, grandpa, girl, God, lady, lassie, mother, man, master, patient, people, pet, sister. Doctor, inspector, nurse.

13a. *Particular Persons:*

II: V. = 20; T. W. = 289.

8 adults, 10 children, 2 literary, etc. personalities.

III: V. = 20; T. W. = 58.

10 adults, 4 children, 6 literary, etc. personalities.

IV: V. = 28; T. W. = 60.

14 adults, 7 children, 7 literary, etc. personalities.

13b. *Institutions:*

II: V. = 5; T. W. = 14.

Farm, home, lecture, post, shop.

III: V. = 9; T. W. = 28.

Church, concert, home, hospital, party, school, shop, University, works.

IV: V. = 9; T. W. = 17.

Band, church, nursing home, home, prison, school, Sunday school, tea-party, works.

14. *Ideal Facts:*

II: V. = 6; T. W. = 15.

Fun, name, nonsense, stuff, thing, way.

III: V. = 15; T. W. = 46.

Bother, care, color, harm, hotness, mischief, name, nonsense, pardon, plenty, secret, stuff, thing, treasure, way.

IV: V. = 17; T. W. = 52.

Attention, beauty, calamity, fun, hurry, kind, mistake, name, permission, plan, question, rosiness, shelter, size, stuff, thing, way.

PRONOUNS

Vocabulary: II, 18; III, 30; IV, 37.
Total Words: II, 257; III, 1,237; IV, 1,577.

1. *Personal:*

II: V. = 7; T. W. = 157.
I, self, me, it, herself, you, us.
III: V. = 17; T. W. = 1,043.
I, me, myself, mine, he, him, she, her, herself, it, we, us, you, yours, they, them, themselves.
IV: V. = 19; T. W. = 1,296.
I, me, myself, mine, he, him, himself, she, her, herself, it, itself, we, us, you, yours, they, them, themselves.

2. *Relative:*

II: V. = 0; T. W. = 0.
III: V. = 2; T. W. = 22.
That, what.
IV: V. = 2; T. W. = 39.
That, what.

3. *Interrogative:*

II: V. = 1; T. W. = 5.
What?
III: V. = 3; T. W. = 38.
What? which? who?
IV: V. = 4; T. W. = 56.
What? which? who? whose?

4. *Demonstrative:*

II: V. = 4; T. W. = 83.
This, that, these, yonder.
III: V. = 3; T. W. = 102.
This, that, these.
IV: V. = 3; T. W. = 131.
This, that, these.

5. *Indefinite, etc.:*

II: V. = 6; T. W. = 12.
Both, one, none, some, something, everything.
III: V. = 6; T. W. = 32.
One, some, anything, anybody, somebody.
IV: V. = 9; T. W. = 55.
One, none, some, any, nobody, anything, anybody, something, somebody.

ADJECTIVES

Vocabulary: II, 89; III, 159; IV, 173.
Total Words: II, 571; III, 1,359; IV, 1,270.

1. *Qualitative:*

II: V. = 69; T. W. = 395.
III: V. = 125; T. W. = 428.
IV: V. = 131; T. W. = 380.

a. *Sense*

II: V. = 14; T. W. = 40.
Black, dark, red, white, yellow. Burning, cold, cool, hot, warm. Sharp, soft, tight. Heavy.
III: V. = 18; T. W. = 40.
Black, blue, pale, red, white. Cold, hot warm. Hard, tickly, tight. Heavy. Humming. Dizzy. Nippy, sour, sweet, thirsty.
IV: V. = 25; T. W. = 55.
Black, black-and-blue, blue, brown, dark, glossy, pink, red, white. Cold, hot, warm. Sharp, blunt, firm, hard, soft, sticky, slack, tight. Heavy. Scented. Dry, sugary, thirsty.

b. *Spatial*

II: V. = 5; T. W. = 169.
Big, little, long, tiny, wee.
III: V. = 15; T. W. = 185.
Big, full, great, last, left, little, long, low, next, short, stout, stumpy, tiny, tremendous, wee.
IV: V. = 26; T. W. = 156.
Back, big, bottom, broad, flat, full, great, high, huge, large, last, little, long, low, low-down, near, next, nigh, past, short, slim, small, tiny, underground, underneath, wee.

c. *Moral and aesthetic*

II: V. = 12; T. W. = 88.
Bad, better, good, kind, naughty, right, silly, sorry. Beautiful, bonny, nice, pretty.
III: V. = 27; T. W. = 90.
Angry, bad, better, careful, careless, generous, gentle, good, horrid, impatient, kind, naughty, polite, proud, right, rude, silly, unsuitable, unkind, worth, wrong. Beautiful, charming, lovely, nice, pretty, ugly.

IV: V. = 20; T. W. = 63.

Bad, better, best, careful, cheeky, frightening, good, kind, naughty, right, rude, worse, wrong. Beautiful, fancy, lovely, nasty, nice, pretty, wonderful.

d. *Human*

II: V. = 16; T. W. = 40.

Busy, clever, cautious, dear, fond, frightened, funny, hungry, late, neat, poor, ready, sore, strong, tired, well.

III: V. = 16; T. W. = 26.

Awful, chubby, dear, fond, funny, healthy, ill, lucky, quiet, poor, rich, sleeping, sore, strong, sure, young.

IV: V. = 28; T. W. = 55.

Able, afraid, alive, awake, barefooted, busy, clumsy, darling, dear, delighted, fat, fond, funny, happy, ill, late, living, poor, quiet, ready, satisfied, smiling, sore, starched, strong, tender, tired, young.

e. *General*

II: V. = 12; T. W. = 35.

Bare, clean, dirty, furry, golden, greasy, naked, new, old, rainy, wet, woolly.

III: V. = 25; T. W. = 53.

Awful, bare, calm, clean, cosy, dangerous, dirty, like, lost, old, open, new, precious, real, rosy, sooty, spilled, steep, sunny, tangled, tough, tuggy, unbreakable, wet, windy.

IV: V. = 18; T. W. = 33.

Barbed, clean, different, difficult, dirty, easy, fizzy, like, new, old, open, precious, real, special, spotless, spick-an-span, wet, wound-up.

f. *Noun (used as adjective)*

II: V. = 10; T. W. = 23.

Apple, baby, Busby, country, darling, farm, flannel, girl, potato, rabbit.

III: V. = 24; T. W. = 34.

Baby, banana, birthday, Busby, china, daddy, deck-chair, dinner, gigot, good-night, hawthorn, india-rubber, Kilmarneck, lace, London, mother, nine-pins, ostrich, party, postoffice, Santa Claus, silk, summer, tongs.

IV: V. = 14; T. W. = 18.

Baby, birthday, button, Cathcart, chicken, Glasgow, glass, gooseberry, hot-water, orange, paper, prune, rose, velvet.

2. *Pronominal:*

II: V. = 2; T. W. = 8.
Your, own.
III: V. = 8; T. W. = 209.
My, his, her, its, our, your, their, own.
IV: V. = 8; T. W. = 187.
My, his, her, its, our, your, their, own.

3. *Demonstrative, etc.:*

II: V. = 5; T. W. = 59.
This, that, yon. Any, another.
III: V. = 9; T. W. = 127.
This, that, these. Any, other, another, else. Each, every.
IV: V. = 12; T. W. = 125.
This, that, these, those, such, yon. Any, other, another, else. Each, every.

3a. *Articles:*

II: V. = 2; T. W. = 57.
III: V. = 2; T. W. = 502.
IV: V. = 2; T. W. = 518.

4. *Interrogative:*

II: V. = 1; T. W. = 2.
What?
III: V. = 3; T. W. = 5.
Whose? which? what?
IV: V. = 3; T. W. = 27.
Whose? which? what?

5. *Quantitative:*

II: V. = 10; T. W. = 50.
One, two. No, none, all, half, enough, much, some, more.
III: V. = 12; T. W. = 88.
One, two, three, four, seven. No, all, whole, much, some, many, more.
IV: V. = 17; T. W. = 133.
One, two, three, four, five, six, dozen. Double. Second. No, all, whole, enough, much, some, many, more.

VERBS

Vocabulary: II, 146; III, 213; IV, 228.
Total Words: II, 1,168; III, 2,312; IV, 2,606.

1. *Intransitive:*

II: V. = 39; T. W. = 311.
III: V. = 61; T. W. = 665.
IV: V. = 62; T. W. = 775.

a. *Motion, etc.*

II: V. = 21; T. W. = 199.
Come, fall, fly, gallop, go, hang, hide, hurry, jump, lean, lie, rise, run, sit, stand, stay, turn, wait, walk, went, wriggle.
III: V. = 29; T. W. = 253.
Climb, come, dance, flit, fly, gallop, go, hang, hide, hurry, jump, lead, lean, lie, rise, run, sit, skip, slip, stand, stay, swim, tumble, turn, wade, wait, walk, went, wriggle.
IV: V. = 34; T. W. = 267.
Bend, climb, clump, come, disappear, drop, fall, fly, go, hang, hide, hurry, jump, kneel, lead, lie, race, reach, rest, run, rush, sit, skip, slide, stand, start, stay, step, stretch, toddle, trip, wait, walk, went.

b. *Natural process*

II: V. = 3; T. W. = 22.
Shine, sleep, waken.
III: V. = 8; T. W. = 15.
Belong, bleach, die, grow, pelt, shine, sleep, wither.
IV: V. = 12; T. W. = 16.
Bloom, drown, grow, happen, light, live, rain, set, shine, sleep, wake, wither.

c. *Personal action*

II: V. = 13; T. W. = 51.
Bark, cry, listen, look, play, shave, shiver, sing, sniff, spit, splash, squeak, work.
III: V. = 18; T. W. = 60.
Bite, care, coax, cock-a-doodle-do, cough, cry, golf, look, peep, play, sing, sniff, speak, sweat, talk, weary, whistle, work.
IV: V. = 10; T. W. = 68.
Cry, laugh, look, play, sing, smile, snap, speak, talk, vomit.

d. *Copula*

II: V. = 2; T. W. = 39.
Be, is.
III: V. = 6; T. W. = 337.
Am, are, is, be, was, were.
IV: V. = 6; T. W. = 424.
Am, are, is, be, was, were.

2. *Transitive:*

II: V. = 100; T. W. = 838.
III: V. = 140; T. W. = 1,103.
IV: V. = 157; T. W. = 1,184.

a. *Food, Dress, Household*

II: V. = 25; T. W. = 82.
Bake, boil, chew, cool, drink, eat, mash, scoot, sip. Comb, darn, mend, sew, tuck. Brush, clean, dry, light, pour, ring, screw, spill, wash, wheel, wipe.
III: V. = 31; T. W. = 80.
Bake, boil, drink, eat, heat, mash. Comb, curl, dirty, hook, pin, sew, tear, tie, tousle, wear. Brush, burn, decorate, iron, lock, paint, pour, red-stone, salt, spill, wash, wheel, wind, wipe, wet.
IV: V. = 29; T. W. = 76.
Butter, chew, cook, drink, eat, mince, swallow. Button, cast, darn, dirty, hook, mend, muddy, pack, pin, sew, soil, tie, wear. Burn, dry, hammer, ring, screw, spill, switch, wash, wind.

b. *Social actions*

II: V. = 19; T. W. = 72.
Buy, draw, post, read, say, write. Frighten, hurt, kiss. Bath, bite, clap, feed, jag, scratch. Ask, help, let, tell.
III: V. = 38; T. W. = 157.
Buy, count, draw, learn, lend, read, say, shew, steal, win, write. Assure, call, check, excuse, frighten, hurt, kiss, love, meet, thank, vex. Bear, choke, clap, cuddle, dress, eye-wink, feed, fit, kill, sting. Ask, beg, help, let, teach, tell.
IV: V. = 34; T. W. = 139.
Buy, answer, learn, read, say, show, write. Call, frighten, hinder, hurt, kiss, love, meet. Bath, cuddle, dress, fan, fit, kill, prick, protect, seat, serve, shelter, tilt, tuck, whip. Allow, ask, help, invite, let, tell.

c. *Mental*

II: V. = 11; T. W. = 210.
Like, mind, need, remember, require, think, try, want. Feel, hear, see.

III: V. = 20; T. W. = 273.
Dream, fancy, guess, know, like, mean, mind, need, pretend, remember, think, try, want, wish, wonder. Feel, hear, notice, see, touch.

IV: V. = 26; T. W. = 265.
Enjoy, fancy, forget, hope, know, like, mean, mind, need, pretend, remember, require, suppose, think, try, understand, want, wish, wonder. Feel, hear, notice, see, smell, taste, touch.

d. *General*

II: V. = 43; T. W. = 457.
Blow, break, bring, brush, carry, catch, cover, cut, do, dig, find, fetch, fold, get, give, hand, have, hold, keep, knock, leave, lift, lose, make, measure, meddle, open, pull, put, push, roll, rub, send, shut, smoke, sort, spread, squeeze, stir, take, throw, water, wave.

III: V. = 45; T. W. = 486.
Break, bring, cover, crowd, carry, catch, change, cut, do, find, finish, get, give, have, hold, join, keep, lay, leave, lift, lose, make, open, pass, pick, pull, push, put, roll, sail, send, set, shake, shut, sow, spoil, squeeze, swing, take, throw, upset, use, watch, wave, wire.

IV: V. = 59; T. W. = 582.
Arrange, bear, blow, break, bring, build, carry, catch, chalk, cling, cover, cross, cut, do, dig, find, finish, fling, gather, get, give, have, hand, hold, keep, kick, knock, lay, leave, lift, lose, make, miss, mix, move, open, paint, pass, peck, pick, press, pull, push, put, roll, rub, shift, shut, sink, skin, snatch, sort, spoil, stot, take, trail, turn, use, watch.

e. *Defective*

II: V. = 2; T. W. = 17.
Can, must.

III: V. = 6; T. W. = 107.
Can, could, may, might, must, should.

IV: V. = 6; T. W. = 122.
Can, could, might, must, ought, should.

3. *Auxiliaries:*

II: V. = 7; T. W. = 19.
Been, do, did, has, is, will, would.
III: V. = 12; T. W. = 544.
Am, are, been, be, do, did, have, is, was, will, would, were.
IV: V. = 12; T. W. = 647.
Am, are, been, be, do, did, have, is, was, will, would, were.

Infinitive (*to*):

II: V. = 1; T. W. = 10.
III: V. = 1; T. W. = 180.
IV: V. = 1; T. W. = 164..

ADVERBS

Vocabulary: II, 46; III, 87; IV, 91.
Total Words: II, 546; III, 732; IV, 1,013.

1. *Time:*

II: V. = 8; T. W. = 37.
Again, first, never, once, soon, to-day, while, yet.
III: V. = 23; T. W. = 73.
Again, always, at first, at once, ever, long, long ago, more, never, now, often, on and on, once, one time, some day, some time, sometimes, still, then, to-day, when?, yesterday, yet.
IV: V. = 24; T. W. = 151.
After, again, ago, always; any more, before, directly, first, long, never, newly, now, often, once, sometimes, soon, still, then, to-day, to-morrow, to-night, when?, yesterday, yet.

2. *Place:*

II: V. = 18; T. W. = 307.
After, away, back, by, down, downstairs, here, home, in, on, off, out, over, round, there, up, upstairs, where?
III: V. = 25; T. W. = 269.
About, across, along, away, below, back, down, downstairs, here, high, home, in, near, off, on, out, out-of-doors, outside, over, round, there, through, up, upstairs, where?

IV: V. = 27; T. W. = 346.

About, away, back, behind, down, far, further, here, home, in, inside, lower, near, next door, nigh, off, on, out, outside, over, past, round, somewhere, there, up, upstairs, where?

3. *Manner:*

II: V. = 6; T. W. = 11.

Fast, fine, hard, right, so, well.

III: V. = 15; T. W. = 33.

Alone, better, carefully, easily, fast, how, loudly, nicely, one-by-one, quickly, right, slowly, so, tenderly, steadily.

IV: V. = 16; T. W. = 88.

Better, brightly, easily, fast, gently, goodly, how, loud, nicely, quickly, quietly, right, so, straightly, suddenly, tightly.

4. *Cause:*

II: V. = 1; T. W. = 1.

Why?

III: V. = 1; T. W. = 48.

Why?

IV: V. = 1; T. W. = 64.

Why?

5. *Degree:*

II: V. = 10; T. W. = 67.

All, awful, big, far, hardly, just, nearly, only, too, very.

III: V. = 18; T. W. = 132.

A bit, all, any, awful, enough, far, just, a little, more, much, nearly, only, plenty, quite, rather, so, too, very.

IV: V. = 18; T. W. = 188.

About, a little, all, as, ever so, enough, far, hardly just, much, nearly, only, perfectly, quite, so, terribly, too, very.

6. *Affirmation and Negation:*

II: V. = 3; T. W. = 123.

Maybe, not, surely.

III: V, = 5; T. W. = 177.

Iphm, not, maybe, perhaps, yes.

IV: V. = 5; T. W. = 176.

Likely, no, not, perhaps, really.

CONJUNCTIONS

Vocabulary: II, 7; III, 21; IV, 28.
Total Words: II, 9; III, 265; IV, 255.

1. *Co-ordinating:*
   II: V. = 4; T. W. = 4.
   And, so, then, well.
   III: V. = 7; T. W. = 172.
   And, but, for, so, then, too, well.
   IV: V. = 11; T. W. = 129.
   Also, and, but, for, now, of course, or, so, then, too, well.

2. *Subordinating:*
   II: V. = 3; T. W. = 5.
   After, when, whenever.
   III: V. = 14; T. W. = 93.
   After, as, because, before, if, in case, than, that, till, when, whenever, where, wherever, while.
   IV: V. = 17; T. W. = 126.
   After, as, because, how, if, in case, seeing, than, that, till, though, unless, until, when, whenever, where, why.

PREPOSITIONS

II: V. = 16; T. W. = 50.
About, after, at, beside, down, for, from, in, of, off, on, over, past, round, side, with.
III: V. = 27; T. W. = 432.
About, after, among, at, before, beside, between, by, down, for, from, in, inside, into, like, of, off, on, on board, out of, over, through, to, under, up, with, without.
IV: V. = 31; T. W. = 497.
About, across, after, among, at, behind, beside, by, down, for, from, in, into, like, near, of, off, on, out of, over, past, round, through, till, to, under, unless, until, up, with, without.

INTERJECTIONS

II: V. = 10; T. W. = 13.
Ah, ahha, aw, eh, oh, please, nonsense, ow, tala, tut,
III: V. = 4; T. W. = 19.
Fie fie shame, oh, please, see.
IV: V. = 7; T. W. = 23.
Ah, aw, Hssh, oh, oh dear, oh dear me, please.

GENERAL SURVEY

It will be convenient, before going on to consider the meaning of the facts and figures comprehended in the three sets of words, to tabulate the results and express them in percentage form.

	VOCABULARY						TOTAL WORDS					
	NUMBER			PER CENT.			NUMBER			PER CENT.		
	II	III	IV	II	III	IV	II	III	IV	II	III	IV
Nouns	323	418	435	49.2	43.5	42.2	1528	1283	1289	36.8	16.4	14.8
Pronouns	18	30	37	2.7	3.1	3.6	257	1237	1577	6.2	15.8	18.1
Adjectives:												
Qualitative	69	125	131	10.5	13.0	12.7	395	428	380	9.5	5.5	4.4
Other adjectives	20	34	42	3.1	3.5	4.1	176	931	890	4.2	11.9	10.2
Verbs	139	201	216	21.2	21.0	21.0	1149	1768	1831	27.7	22.6	21.1
Auxiliaries	7	12	12	1.1	1.2	1.2	19	544	775	.5	7.0	8.9
To (Infin.)	1	1	1	.2	.1	.1	10	180	164	.2	2.3	1.9
Adverbs	46	87	91	7.0	9.1	8.8	546	731	1013	13.2	9.4	11.6
Conjunctions	7	21	28	1.1	2.2	2.7	9	265	255	.2	3.4	2.9
Prepositions	16	27	31	2.4	2.8	3.0	50	432	497	1.2	5.6	5.7
Interjections	10	4	7	1.5	.4	.7	13	19	23	.3	.2	.3
Total	656	960	1031				4152	7818	8694			

In the actual vocabularies, it will be noted, there is a steady increase with greater age in every case (with the insignificant exception of the interjections)—a large increase from 2 to 3, a small but quite definite increase from 3 to 4. The proportionate distribution of the several parts of speech affected by the changes due to age follows a rather different course. The percentage of nouns decreases very considerably from 2 to 3, and the decrease though smaller continues in the following year. Verbs, which with the nouns make up about two-thirds of the vocabulary, stand steady at 21% all through. In the proportions of the other parts of speech, there is a well marked advance from 2 to 3, followed in the next year by a slight advance or a slight retrogression. Taken as a whole, the percentage figures indicate a considerable difference between the vocabulary of the second year and that of the succeeding years, due chiefly to the preponderance of nouns and a deficiency in relational words. Not less striking is the similarity of the vocabularies of the third and fourth years. The percentage of verbs is the same, and there is only a small reduction in the proportion of nouns, qualitative adjectives and adverbs, and a small increase in the proportion of pronouns, adjectives other than qualitative, conjunctions and prepositions.

As might be expected, the figures relating to the total words reproduce (with some important exceptions) the main features of the Vocabulary Table. There is evident the same general tendency to an increase in the number of words in each group year by year, except in the nouns, which stand about the same figure throughout,[3] and the adjectives and conjunctions, which are fewer in the fourth than in the third year. There is the same difference in the proportionate distribution of words between the second year and the other two, and the same resemblance between the third and fourth years, but the difference is greater and the resemblance is less. A very striking feature is the sharp fall from the second to the third year in the percentage of nouns, verbs, adjectives and adverbs, and the related rise in the percentage of pronouns, adjectives other than qualitative, auxiliaries, conjunctions and prepositions. The difference is obviously connected with the profound changes which take place in the course of the third year in the organization of speech.

Nouns: It is not possible within the scope of this article to do more than indicate the outstanding points of interest suggested by the lists of nouns. With a view to this, I give the percentage of the total words in the main groups of nouns in the three successive years.

		II	III	IV
1.	Body, etc.	4.6	9.2	9.1
2.	Food	10.0	5.9	6.0
3.	Dress	5.2	5.8	6.7
4.	Domestic, etc.	13.4	8.0	11.2
5.	House	2.8	3.9	4.5
6–8.	Topography, etc.	4.6	8.1	11.5
9.	Animals	8.0	7.6	6.0
10.	Plants	1.1	2.5	3.3
11.	Play, etc.	10.8	10.7	6.9
12.	Time, quantity, etc.	2.7	6.7	10.6
13.	People, etc.	38.3	28.3	20.3
14.	Ideal facts	1.0	3.6	4.0

These figures for the most part speak for themselves and need little commentary beyond the lists of words to which they refer. They show a relatively increasing use of words relating to parts of the body, dress, the parts and furnishings of the house, country objects, locomotion, plants, facts of time, quantity and position, and abstract ideas; and a relatively decreasing use of words having reference to food, household articles, animals, play and occupations, people and institutions. The reason is generally not difficult to find. There is obvious in some cases the gradual widening of the mental horizon that makes the facts of home life of less importance and turns the attention further afield. In other cases (for example, in the remarkable progress in the use of quantitative terms, which is one of the distinctive features of the fourth year) there is evident a growth in the power to work with abstract ideas and relations. But why the decline in play words and in words referring to animals? Why again the marked decrease, especially in the fourth year, in words denoting persons of all sorts and particularly official persons, as well, as social institutions? There are certainly no other signs of a diminishing interest in such facts, and no deficiency of words relating to them in the complete vocabulary. The explanation would seem to be that verbal expression registers not the greatest interest but the greatest *new* interest.

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[3] The child's own name occurs in the second year's list 231 times. Subtracting this, the figures are: II. 1297; III, 1283; IV, 1289.

Pronouns: One of the most noteworthy phases in the development of the child's vocabulary is the increasing part played by the pronouns. There are comparatively few pronouns in the two-year-old's speech, the only ones in easy use being the demonstratives. The number increases rapidly in the third year and continues to increase in the fourth year with the progress of the mind in generality. The following table, giving the whole number of pronouns used from 2 to 4, indicates the general character of the increase.

Personal	157	1043	1296
Relative	0	22	39
Interrogative	5	38	56
Demonstrative	83	102	131
Indefinite	12	32	55

The most interesting group is that of the Personal Pronouns, which are responsible for the greatest part of the increase. It is important to note that with the more frequent use of them goes a remarkable change in their character, which reflects the development of the child's social consciousness. This is clearly brought out by a percentage statement of the total number of the different pronouns of this group used at the three ages under consideration:

I*	64.2	51.4	40.6
We	.3	2.0	5.3
You	2.6	14.3	18.8
He, she, they	....	14.7	14.8
It	33.0	17.6	20.5

* With each pronoun I include its various forms: "me" and "myself" with "I"; "us" with "we" and so on. In the second year I have included the child's own name under the first personal pronoun; otherwise the comparison suggested would have lost much of its force.

The diminishing importance of the 'I' and the growing use of the other pronouns, especially of the 'we' and the 'you,' is a significant revelation of the process by which the self-centered child is transformed into a social being.

Adjectives: Quite a number of problems are suggested by the lists of adjectives. Why does such an important part of speech as the qualitative adjective occupy a progressively smaller place in the vocabulary in use? Why in the fourth year should there be an increase in sensory epithets and a decline in moral ones? Why should the pronominal and demonstrative adjectives after establishing themselves in the third year fall away in the fourth? We will seek an answer for these and similar questions, in the first instance, by examining the lists of qualitative adjectives. The total number of words in the several groups of these in the years under consideration, we find to be as follows:

Sense	40	40	55
Spatial, etc.	169	185	156
Moral and aesthetic	88	90	63
Human	40	26	55
General	35	53	33
Noun (used as adjective)	23	34	18

The striking fact here is that in every case the difference between the numbers in the third and fourth years is due to a very considerable increment or decrement, evidently the result of some change in the use that is being made of the particular group of words. The adjectives denoting largeness and smallness, which make up nearly a third of the qualitative adjectives in the second year, and which account for no little part of the total decrease by their shrinkage in the two succeeding years, will perhaps help us to an explanation. Here is a list of them with the number of times they occur.

II		III		IV	
Big	11	Big	43	Big	31
		Great	2	Great	7
				Huge	1
				Large	1
Little	1	Little	11	Little	36
				Small	1
Tiny	2	Tiny	6	Tiny	4
Wee	154	Wee	101	Wee	37
Total	168	Total	163	Total	118

The interesting fact brought out is that though there is a greater number of words less use is made of them. The greater number of words is understandable, but why the decreasing use? Presumably it is because the attributes which are explicitly stated become familiar and are subsequently omitted. The child begins by speaking about 'a *wee* baby,' then comes to take the weeness for granted as a characteristic of babies, and speaks only of 'a baby.' If this is the general process, the groups of adjectives which show an increment are those whose significance is only being realized, and which therefore need an explicit attribution. The adjectives which show a decrement, on the other hand, refer to familiar qualities whose presence is generally assumed without mention or only occasionally indicated. With the latter in the majority, the result is a decrease in the total number of adjectives. This explanation is supported by the fact that there is a small but definite decrease in the attributive use of adjectives and a corresponding increase in the predicative use from the second to the fourth year. The percentage of the whole number of adjectives which are used attributively is 75.3 in the second year, 72.6 in the third, and 70.6 in the fourth.

The same explanation applies to adjectives other than qualitative. Interrogative and quantitative adjectives occur in greater numbers with the advance in age, because the proper use of them depends on powers of mind which even in the fourth year are somewhat imperfectly developed. Pronominal and demonstrative adjectives, on the other hand, though presenting difficulties at 2, are used with freedom at 3, and are in less frequent evidence at 4.

Verbs: Beyond the broad division into Transitive, Intransitive and Auxiliary, it is difficult to classify the verbs employed by the child in such a way as to illustrate mental development, probably because there is a large number of verbs of vague and indeterminate reference, which do not fit exactly into any system of grouping. The classification I have employed is the least unsatisfactory of two or three which I have attempted to make. I give it without comment, because the many points it suggests would call for a greater amount of detailed discussion than it is possible to enter into here. One feature of interest, to which reference may be made is the paucity of defective, copulative and auxiliary verbs in the second year. This is one of the most characteristic features of the speech at this stage, and marks it off sharply from that of the two succeeding years. It is worthy of note, in this connection, that when the defective are deducted from the other transitive verbs, and the copulative from the other intransitive verbs, the proportion of transitive to intransitive verbs in all three years stands almost exactly at three to one: the percentage of transitive verbs being—II, 75.1; III, 75.2; IV, 75.2.

Adverbs: The main changes which take place in the child's use of the adverbial qualification are indicated by a percentage statement of the figures already given in the three lists.

	VOCABULARY			TOTAL WORDS		
	II	III	IV	II	III	IV
Time	17.4	26.4	26.4	6.8	10.0	14.9
Place	39.1	28.7	29.7	56.2	36.7	34.2
Manner	13.0	17.2	17.6	2.0	4.5	8.7
Cause	2.2	1.1	1.1	.2	6.6	6.3
Degree	21.7	20.7	19.8	12.3	18.1	18.6
Affirmation, etc	6.5	5.8	5.5	22.5	24 2	17.4

The impression produced by the closeness of the percentages of the different groups of adverbs at 3 and 4 is that by 3 the child has acquired a tolerably complete equipment of adverbs and that for a year or two at least there is no substantial addition made to the working vocabulary at this point. This is confirmed by a consideration of the actual words used. But this does not mean that there is no development in adverbial modifications. The percentages of the total number of the different adverbs, on the contrary, shows that very considerable changes are going on. Adverbs of place which at 2 are more than half of all the adverbs used, while still numerous at 3 and 4, have become less important. Adverbs of time and manner, which though well represented in the vocabulary are much less in use, show a steady increase that reveals the progress of the mind from spatial to higher modes of thought. A like advance is indicated by the use of 'Why?', which only occurs once in the sentences at 2 but is well established at 3 and 4. Adverbs of degree also become more common, but as the increase is largely due to an irritatingly frequent use of the vague word 'just,' it has little significance. The only other point to be noted is the marked decrease of the negative in the fourth year.

Conjunctions: A simple index of the progressive development of sentence structure is furnished by the conjunctions. The total number occurring in the three collections of sentences was as follows:

Co-ordinating	4	172	129
Sub-ordinating	5	93	126

At 2, practically no conjunctions were employed. Of the 7 which appear in the vocabulary at that age, only one was used more than once, the exception curiously enough being 'whenever,' which was used three times. This must not be taken to imply that there were only simple sentences at 2. In point of fact, there were no fewer than 50 clauses which a grammarian would describe as subordinate, though in all but 5 cases the subordination was not marked by a conjunction or other special word. In the course of the third year, conjunctions of all kinds became common. In particular, the words 'and' and 'but' were much in evidence. It is one of the unexpected differences between the third and the fourth years that both of these words and especially the latter were less frequent in the fourth year, with the result that the number of co-ordinating conjunctions showed a very considerable drop. Against this, there is a decided increase both in the number and variety of the subordinating conjunctions: the percentage of these at 3 is 35.1, while at 4 it reaches no less than 49.4. The difference is mainly accounted for by the appearance of noun clauses introduced by 'how' and 'that,' and adverbial clauses of comparison introduced by 'than' and 'as.' 'When,' 'if,' 'because,' are equally prominent on both lists.

Prepositions: Beyond the fact that there is a large increase in the use of the prepositions between the second and the third years and a small increase between the third and fourth, there is not much to be said about the prepositions. The lists of the prepositions used at 3 and 4 include all the ordinary prepositions in adult speech.

Interjections: An interjection not being a proper part of speech, it was not to be expected that the interjections would figure largely or typically in the collections of sentences which have formed the basis of the present study. It does not seem to me at any rate that any conclusions can be drawn from the scanty lists of interjections which they furnish.

The Complete Vocabulary at Three and Four

With a view to a comparison between the complete vocabulary and that part of it contained in the collected sentences, I proceeded to make a record of the complete vocabulary as soon as I had finished the grouping of the words in the sentences. During the month which it took to classify the working vocabulary, I only jotted down exceptional words which might chance to be overlooked at a later time. Then in the following month, I collected assiduously every word which might conceivably be absent from my first lists. At the end of this month, I went over these first lists, struck off the ephemeral words and some words (such as nouns used as adjectives) which had been duplicated, and then put the new collection of words under their proper headings. But I knew that there was still a very considerable number of words which the child could use quite well, even though they did not happen to have been used during the two months over which my collecting had extended. To get these with as much certainty as the case permitted, I then compiled a further list of words which might possibly be in her vocabulary. Some of these were suggested by a study of the lists of assured words, the grouping of which was very helpful for this purpose. A number were got in the third year by scanning the second year lists, and in the fourth year by scanning the third year lists. A few were got by a cautious use of the vocabularies published by previous investigators. With the assistance of the child's mother I scrutinized the list of possible words, and tested the doubtful ones as far as I could, by trying to get the child to use them. In this way, I succeeded in making as complete and as accurate a record of the child's actual vocabulary as one could reasonably expect to make.[1]

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[1] In the vocabularies compiled by me, the past tense and past participle of verbs are not included, except in a few abnormal cases (e. g., 'go' and 'went'). The practice of including these parts of the verb seems to me a foolish one, calculated to confuse the vocabulary as an expression of mental content and to add unnecessary difficulties to the comparison of different children's vocabularies or of the vocabularies of the same child at different ages. There is some slight justification for it in the case of two-year-old children, though even then the beginnings of the distinction between form and content are occasionally to be seen. There is none whatever in the case of four-year-old children, who are generally able to form the past tense and past participle of any verb. If these parts are to be included, consistency demands the inclusion of the plurals of nouns as well.

I give a numerical statement of the results without further comment:

	COMPLETE VOCABULARY			
	III	IV	III	IV
Nouns	918	1441	55.4	55.5
Pronouns	30	38	1.8	1.5
Adjectives:				
Qualitative	165	294	10.0	11.3
Other adjectives	35	70	2.1	2.7
Verbs	344	541	20.8	20.8
Adverbs	109	140	6.6	5.4
Conjunctions	21	31	1.3	1.2
Prepositions	29	33	1.8	1.3
Interjections	6	10	.3	.4
Total	1657	2598	100.1	100.1

THE VOCABULARY OF A THREE-YEAR-OLD GIRL

By Arthur Dermont Bush, M. D.

Introduction

This vocabulary is offered as a contribution to the data for the growing science of psychogenetics. Just such additions to the present isolated groups of observations will, in time, provide sufficient material for reliable averages and generalizations. The existent state of our knowledge of psychogenetics is such that tentative conclusions only may be justly drawn. In but a few cases have careful, scientific observations been made of the daily life of a child; yet by such a daily record, only, can trustworthy data be secured. A model of such work is Preyer's.

Studies of children's vocabularies are scattering and few; moreover, such studies must necessarily show considerable variation, because of parental proclivities; they will probably show, also, a record considerably above a normal average inasmuch as the studies will usually be made by parents having studious habits,—mental conditions inevitably reflected in the vocabularies of the children. Few such studies will be obtained from children of the lower middle classes, or those below, as the parents have not the leisure, patience or inclination necessary for compiling vocabularies. Even among those more favored of fortune, the necessary assiduity is too often lacking. Such vocabularies as appear should, therefore, be accompanied by brief histories of the child, its environment, and its parentage. These will serve to check undue estimates as to reasonable averages, or erroneous deductions as to possible demands of other children.

The child, B, was conceived in religiously-intense philoprogenitiveness, nurtured antenatally with thoughtfulness and care, and trained since birth with that form of love that endeavors to always place childhood welfare over and above parental comfort and selfishness. At the age of three months, because of inadequate nourishment, the child was transferred, much to the mother's disappointment, from the breast to the bottle, her diet becoming then cow's milk modified, at first, by percentage solutions, later, by dextrinized flour. Her first year was spent in a suburb of Boston very much under the personal attention of both parents. Her second and third years were spent in a beautiful city in northern Vermont. During most of this time she has had very few playmates, losing thereby somewhat of social development, but gaining greatly in comparative freedom from interfering cross-currents. In the past six months her social life has greatly broadened bringing with it much good, and some ill. She is now, at the age of three years, a sweet winsome little girl, happy of disposition, very loving and lovable, strong and well of body (having had no illness since birth more severe than bowel disturbances and "colds"); keen and bright of mind, quick to comprehend and eager to learn.

The parents were both over thirty at the date of the child's conception. Both are of the brunette type, the mother being slightly the darker. Both were born of middle-class parents, and both have improved their inheritance. Dispositions congenial.

The mother is a normal-school graduate (Mass.), with six years' successful experience as a teacher in the grade schools. She is a lover of nature and the great outdoors, a theoretical suffragist, a woman of high ideals, and a devoted wife and mother.

The father, who is also the child's chum, had as a boy left the factory after six years discontent as a day laborer. Fitting himself for college he later took up the study of medicine, became a practitioner for four years, then an all-time teacher. He is a lover of music and fine literature, a scientific dreamer, an agnostic in philosophy, and an insurgent in pedagogy and politics.

While there has been no attempt to force the child, there have been studied efforts at constructive play, at directing the child's bounding energies into fruitful channels. Meaningless playthings have been tabooed; instead, articles of adaptive utility have been provided as completely as possible. At the age of two, the child was given the Montessori outfit (as an experiment), and quickly learned to build the "stairs," rightly place the cylindrical insets, correctly assemble the geometrical insets, and harmoniously assort the sixty-four color cards. At present the balance of the outfit interests her but little, and is, therefore, neglected in favor of outdoor interests for the summer. Methods of child culture as suggested by Pryor, Hall and Armstrong, and as scantily indicated by Sidis and Berle, have been carefully weighed and utilized as available. Very early with her dawning comprehension the parents reasoned with her, not only as to the *wherefore* of things but also as to the *why* of conduct. This greatly stimulated the child's associative faculty, and bred a developing habit of weighing and comparing. True, this makes response in obedience occasionally tardy, but it creates a spirit of understanding and an intuition of justice that makes discipline a relatively simple matter. The suggestion made by Berle that explanations to a child should be both voluminous and discursive has found satisfactory utilization in the present case.

It must not be understood that the present vocabulary comprises all the words the child makes use of, but simply those which for the child have a *definite connotation capable of being again intelligently used in some other relationship.* She knows, for instance, a considerable number of musical rhymes which she repeats with an evident appreciation of the cadence and rhythm; but in these rhymes occur many words which for her have little or no meaning; and these words have not been included in the list. There are also not included a considerable number of original sounds which, though presumably expressing something to her, yet obviously are not recognized by grammarians. Some original compounds, likewise, though connoting understanding as, for example, "*ungarter* my stockings," or "I do not wish to go to bed *mylone,*" are necessarily not included. Some words represent unfortunate contributions from other children, as, for example, "slap" and "kick,"—words she has never heard in her home, and words whose meaning she has never personally experienced except in association this summer with neighboring children. (It is believed that much of this child's sweetness of manner may well be ascribed to the entire absence in her home life of the brutalizing influence of personal violence.)

The words here given are words she has intelligently used during the past six months. They have been grouped grammatically, the better to illustrate the exact sense in which they were employed, as well as to facilitate study and reference. Plurals of nouns have not been counted except where differences of spelling justified. Verb inflections have been counted where the verb is irregular, where the tense form demands, and where the participle was involved. Fine distinctions as to adverbs may be called in question though this classification is of course more or less artificial; it does not affect the usage, however. The details as to pronouns simply represent the varieties of observed use; the object of so classifying is to bring out these variations.

To some it may at first seem that a word has been counted more than once; but such enumeration is justified by the sense in which the word is employed. For example, the word "that" occurs three times: (1) as an adjective, (2) as a demonstrative pronoun, and (3) as a conjunction; but since the word each time has a separate meaning, we may rightfully hold that it has a logical independence. Examples: (1) "That dog might bite me," (2) "Whose hat is that?" (3) "Mama, Papa says that I may go."

Method

The method of making up B's vocabulary was as follows: (a) For six months previous to the child's third birthday records were kept by the father and mother of all the words the child was heard to use; (b) a week previous to the third birthday, a small dictionary was scanned for such words as discreet tests proved were being used intelligently by the child; finally (c), comparison was made with the published vocabulary of a three-year-old boy (Whipple, *Pedagogical Seminary,* 16, 1, 1909), and several more words were thereby obtained.

Nouns

Ache
afternoon
air
animal
ankle
ant
anybody
anything
apple
applesauce
apron
arm
ashes
asparagus
aunt
automobile
ax

Baby
back
backside
bacon
bag
ball
balloon
banana
band
bang
banister
bank
bar
barn
barrel
basin
basket
bath
bathrobe
bathroom
bathtub
beach
bead
beans
bear
bed
bedroom
bedclothes
bedtime
bee
beefsteak
bell
beets
bill
belly
bellyband
belt
berry
bib
bicycle
bird
birthday
biscuit
bit
bite
blackberry
blackbirds
blanket
blocks
blood
blossom
boat
board
body
bone
bonnet
book
bookcase
bottle
bouquet
bowels
bowl
box
boy
bread
breakfast
breast
breath
bridge
brook
broom
brother
brush
bubble
bud
buffalo
buffet
bug
building
bump
bunch
bundle
bunny
bureau
burn
bush
butter

buttercup
butterfly
button
buttonhole
buttonhook

Cabinet
cage
cake
camel
can
candle
candy
cane
canine (tooth)
cap
cape
car
card
carnation
carpet
carriage
cart
cat
caterpillar
ceiling
celery
cent
centre
cereal
chain
chair
chalk
chamber
cheek
cherry
chiffonier
child
children
chimney
chin
christmas
christmas-tree
chum
chicken
chocolates
church
circle
circus
claws
clock
closet
cloth
clothes
clothesline
clothespins
cloud
coal
coat
cocoa
collar
college
color
comb
common-pin
company
compasses
cookies
cork
corn
cornmeal
corner
cornflakes
couch
cotton
cough
count
cover
cow
crack
crackers
cradle
cranberries
crank
crayon
cream
crib
croquet
crow
crumb
crust
cry
cuff
cuff-buttons
cup
curbstone
curl
curtain
cushion
custard
cut
cylinder

Daddy
daisy
dance
dandelion
darling
daughter
day
daytime
decorations
deer
dent
desk
dessert
diaper
diarrhoea
dimple
ding-dong
dinner
dining-room
dipper
dirt
dish
doctor
dog
doll
dolly
door
dove
drawer
drawers
dream
dress
dresser
drink
drive
drop
drum
duck
dust
dust-pan

Ear
egg
elbow
elephant
end
enema
engine
envelope
evening
everything
eye

Face
facecloth
fall
fan
fat
father
feather
feet
fence
field
fig
finger
fingernail
fire
firebell
fireengine
fireplace
fish

fist
flag
flame
flash
flatiron
flies
floor
flour
flower
fly
folks
food
foot
forearm
forehead
fork
fountain
fox
friend
front
fruit
fudge
fun
fur
furnace

Game
garbage
garden
garret
garter
gas
gate
geese
gift
giraffe
girl
glass
glass (water)
glove
glue
goat
gold
goose
grammy
granddaughter
grandfather
grandmother
grandpa
grape
grass
gravy
grease
greens
grip
grocery
ground
gum
gums
gutter

Hair
hairbrush
haircomb
hairpin
half
hall
hammer
hammock
hand
handful
handkerchief
hash
hassock
hatchet
hat
hay
head
headache
heap
heat
heel
hen
hiccough
high-chair
hill
hip
hoe
hole
holly
home
honey
hood
horn
horn (cow's)
horse
horseback
hose
hospital
hotel
hour
house
hubby
hug
hurry

Ice
icecream
Indian
ink
insect
iron
ironing-board
island

Jack o lantern
jambalaya*
jar
jaw
jelly
jewelry
johnny-cake
joke
jug
juice
jumprope

Kettle
kewpies
key
kick
kid
kimona
kind of
kiss
kitchen
kitten
kitty
knee
knife
knock
know

Laboratory
lace
ladder
lady
lard
lake
lamb
lamp
land
lantern
lap
laugh
lawn
lawn-mower
lead-pencil
leaf
leak
leaves
leg
leggings
lemon
lens
letter
lettuce
library

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* A Southern dish composed of rice, shrimps, etc.

lid
light
lightning
line
linen
lion
lip
loaf
lock
locket
look
lot
lullaby
lump
lunch

Macaroni
machine
magazine
mail
mailman
man
ma
mama
marbles
mark
market
mat
match
matter
mattress
meadow
meal
meat
medicine
men
mess
middle
milk
milk-bottle
milk-man
mill
minute
mirror
miss
mister
mitten
moment
money
monkey
moo
moon
moonlight
moose
mop
morning
mosquito
mother
mountain
mouth
mouthful
movement
mud
muff
muffin
mug
mush
music
music-box

Nail
name
nap
napkin
napkin-ring
neck
neckpiece
necktie
needle
newspaper
night
nightdress
nightgown
nighttime
nipple
noise
noon
nose
nothing
nurse
nut

Oar
oatmeal
office
oil
ointment
olives
omelet
opening
orange
oven
overcoat
owl
oyster
oxen

Package
packing
page
pail
pain
paint
palm
pan
pansy
pantry
papa
paper
paper (news)
parade
parasol
parcel
pardon
park
parlor
part
party
path
pavement
pea
peach
peanut-butter
pear
pearl
pecan
pedals
pen
pencil
penny
people
pepper
peppermint
person
pet
petticoat
piano
piazza
picnic
picture
pie
piece
pig
pigeon
pile
pill
pillow
pin
pin-cushion
pine
pipe
pitcher
place
plane
plant
plaster
plate
play
playmate
playtime
pleasure
plenty
plum

pocket
pocketbook
point
poker
pole
pond
pony
post
postcard
postman
post-office
posy
pot
potato
powder
presents
prison
professor
pudding
puddle
puff
puffed rice
puffed wheat
pug
pumpkin
purse
pussy

Question
quilt

Rabbit
race
racket
radish
rag
railroad
rain
rainbow
raisins
rake
rap
raspberry
rat
razor
reader
reflection
refrigerator
reins
rhubarb
ribbon
rice
rim
ring
ringing
rip
river
road
roar
roast
robe
robin
rock
rocking-chair
rod
rogue
roller
rompers
roof
room
root
rope
rose
row
rubber-band
rubbers
rubbish
rug
ruler
rut

Safety-pin
sail
salad
salt
saltcellar
saltines
salve
sand
sandals
sandpaper
sandwich
sauce
saucer
saw
scent
school
schoolboy
schoolgirl
scissors
scratch
scream
screen
screws
screwdriver
scum
sea
seat
second
seed
see-saw
sewer
shade
shadow
shavings
shawl
shed
sheep
sheet
shelf
shell
ship
shirt
shoe
shoestring
shop
shore
shoulder
shovel
shower
shreddedwheat
shrimps
sickness
side
sidewalk
sieve
silk
silver
sink
sip
sir
sirup
sister
sitting-room
skin
skirt
skull
sky
slat
slate
sled
sleeve
slippers
slide
sliver
slumber-song
smack
smell
smile
smoke
sneeze
snow
snowball
snowman
snowplow
soap
soapbubbles
soapsuds
sob
socks
soda
soldiers

sole
somersets
somebody
something
son
song
sound
soup
sparrow
speck
spider
spinach
splash
splint
sponge
spool
spoon
spoonful
spot
spray
spread
squash
squeal
squeeze
squirrel
stain
stair
staircase
stamp
stand
star
starch
station
steam
steamboat
steamengine
steamroller
steeple
stem
step
steps
stew
stick
stocking
stomach
stone
stool
stopple
store
storm
story
stove
strap
strawberry
street
string
strop
study
stuff
stuffing
stump
stunt
suds
sugar
suit
sun
sunburn
sunbonnet
sunlight
sunset
sunshine
supper
suspender
sweater
sweetheart
swing

Table
tablecloth
tacks
tail
tag
tan
taste
taxi
tea
tea-kettle
team
teapot
tea-party
tear
tears
teddy-bear
teeth
telephone
tent
thermometer
thigh
thimble
thing
thread
throat
thumb
thunder
thunderstorm
tick
tie
tiger
time
toast
today
toe
toe-nail
toilet
tomato
tomorrow
tongue
tonight
tooth
tooth-brush
top
top (toy)
touch
towel
tower
town
toy
track
train
tray
tree
treetop
trick
trimming
trolleycar
trousers
trunk
tub
tunnel
typewriter

Umbrella
umbrellarack
uncle
underdrawers
union-suit
university

Vanilla
vase
vegetable
velvet
verse
vine
vinegar
violet
violin

Wagon
waist
waistband
waistcoat
walk
wall
washboard
washcloth
washing
watch
water
waterfall
watering-cart

watering-pot
wave
way
weather
weeds
wheel
wheelbarrow
whip
whipped cream
white-meat
wind
wind-mill
window
window-seat
wink
wire
wolf
woman
worm
wood
woods
word
wringer
writing
writing-paper

Yard
yarn
yawn
year
yeast
yesterday

Zebra

PROPER NOUNS

Athol
Boston
Burlington
Christmas
Ethan Allen Park
Grassmount
Hungerford Terrace
Jupiter
Main Street
Venus
Woburn

Names

Arthur
Bladen
Cyril
Duncan
Ebbert
Emerson
Eustace
Fred
George
Herbert
Jack
John
Kenneth
Louis
Merrell
Ralph
Richard
Rodney
Walker

Abbie
Adeline
Bessie
Bettina
Dorothy
Edna
Eleanor
Geraldine
Gladys
Grace
Gretchen
Harriet
Helen
Hilda
Irma
Janet
Katherine
Lois
Lucy
Mabel
Margaret
Minnie
Pauline
Peggy
Ruth
Susan
Ursula

Surnames

Brown
Bush
Dalton
Howard
Jenks
Joseph
Ogle
Maier
Patten
Perkins
Reeves

PRONOUNS

Personal

I	me	my	mine	myself
you	you	your	yours	yourself
he	him	his	his	himself
she	her	her	hers	herself
we	us	our	ours	ourselves
they	them	their	theirs	themselves
it				

Relative

who
whom
whose
which
as

Interrogative

what
which
who

Demonstrative

that
this
these
those

Adjective Pronouns

all
neither
no
none
own
same
some

Verbs

Ache
am
answer
are
aren't
ask
ate

Back
bake
bang
bark
bathe
bathing
be
been
beg
begin
believe
belong
bend
bite
bleed
blow
bounce
break
breathe
bring
broke
broken
brought
brush
buckle
build
building
bump
burn
burnt
burst
butter
button
buy

Call
can
cannot
carry
catch
change
chew
clap
clasp
claw
clean
cleaning
climb
cling
close
closed
comb
come
coming
cook
cool
cough
could
count
cover
crack
crank
crawl
creep
creeping
crumb
cry
crying
curl
cut

Dance
dancing
desire
did
didn't
dig
dip
disturb
do
doing
does
done
dont
double
drag
drank
draw
dream
dress
drink
drive
drop
drum
dry
dump

Eat
empty
excuse
expect
explain

Fall
fan
fasten
feel
fell
felt
fetch
fill
find
fix
fixing
fixed
flop
fly
flying
fold
forget
forgot
found
freeze
frighten
fry
frying

Gather
gave
get
getting
give
go
going
gone
got
grab
grasp
grind
ground
grow
growl
guess

Had
hammer
hand
handle
happen
harm
have
has
heal
heap
hear
heard
held
help
hiccough
hide
hiding
hit
hold
hook
hop
hope
hug
hurry
hurt

Intend
invite
iron
is
itches

Jar
jingle
jingling
joggle
jounce
jump

Keep
keeping
kept
kick
kill
kiss
kissing
kneel
knock
knot
know

Lace
laceing
laid
laugh
laughing
lay
laying
lead
leak
lean
leave
left
let
lie (recline)
lift
like
listen
live
lock
look
looking
lose
lost
love
lunch

Made
make
make believe
march
mark
may
meet
melt
mend
mew
might
mix
moisten
mop
move
moving
must

Name
need
Obey
observe
offer
offering
oil
open
ought

Paddle
parade
pardon
pare
pack
paint
pass
passed
pat
pay
peel
packing
peeking
pet
pick
pile
pin
place
plant
play (ball)
play (piano)
please
point
pound
pour
powder
prefer
prick
print
promise
pull
push
put

Race
rain
raining
raise
raising
rake
ran
rap
reach
read
reading
reason
refreshing
remember
remove

repeat
rest
resting
return
ride
riding
ring
rinse
rip
rise
rock
rode
roll
romp
row
rub
run
running

Said
sail
sang
sat
save
saw
saw (p. of see)
say
saying
scamper
scare
scatter
scorch
scratch
scream
screaming
scrub
search
see
seeing
seen
sell
send
serve
set
sew
shake
shall
shave
shaving
shine
shining
shook
should
shout
shovel
show
shut
sing
sink
sip
sit
sitting
skip
slap
sleep
sleeping
slide
slip
smash
smell
smelling
smile
smoke
snap
snarl
sneeze
snow
snuggle
soak
soap
sob
soil
sop
sour
spatter
speak
spell
spend
spill
spin
spit
splash
spoil
spray
spread
sprinkle
spurt
squat
squeal
squeeze
squirm
stain
stamp
stamping
stand
standing
start
stay
steady
sleep
steer
step
stick
stir
stood
stoop
stop
strap
strike
stub
study
suck
suit
suppose
surprise
swallow
sweep
swim
swing
swinging

Take
talk
talking
taste
teach
tear
telephone
tell
thank
think
thinking
thought
throw
throwing
thunder
tick
tickle
tie
tip
tipping
tire
toast
told
took
tote
torn
toss
touch
trim
trot
try
trying
tuck
tumble
turn
turning

Unbutton
undo
understand
undress
unhook

unlace
unlock
untie
unwind
use

Visit

Wade
wait
wake
waked-up
walk
want
warm
was

wasn't
wash
washing
waste
watch
watching
water
wave
wear
went
were
wet
wheel
whisper
whistle
will

wind
wink
wipe
wish
wonder
won't
work
worn
would
wouldn't
wring
write
wrote

Yawn
yawning

Adjectives

A
afraid
all
alone
an
another
any
asleep
aunt
awake

Bad
bare
barefoot
barehead
beautiful
best
better
big
black
blessed
bloody
blue
both
broken
brown
busy

Careful
chilly
clean
close
cold
colder
comfortable
cool
cunning

Damp
dark
darling
dead
dear
deep
delicious
different
dirty
double
dry
dusty

Each
easy
else
empty
every
enough
empty
expensive

Far
farther
fast
faster
fat
few
fine
first
five
flat
fortunate
four
fresh
fried
full
funny
further

Gentle
glad
gold
good
grand
gray
great
green

Happy
hard
heavy
high
horrid
hot
hubbly
hungry

Icy
inside

Jolly
juicy

Kid
kind

Large
last
late
left
less
light
little
long
longer
loud
lovely
low

Main
many
miserable
moist
more
most
much
muddy

Naked
nasty
near
necessary
nice
noisy
no good
none
naughty

Old
one
other
open
orange

Patient
pink
pleasant
poor
possible
pretty
prickly
purple

Queer
quick
quiet

Ragged
rainy
raw
ready
real
red
right
ripe
rocky
rotten
rough
round
rusty

Safe
same
scarlet
shady
sharp
short
sick
simple
sleepy
slow
small
smooth
snug
soapy
soft
solid
some
sore
sorry
sour
sticky
straight
strong
such
sunny
sure
sweet

Tall
tan
that
the
these
thick
thirsty
this
those
three
tight
tiny
tired
toasted
two

Uncle
uneven
unhappy

Violet

Warm
warmer
weary
welcome
well
wet
what
which
white
whole
wide
willing
windy
wonderful
wrong
wrong-side-out

Yellow

Adverbs

Time

afterwards
again
by and by
first
last
next
now
once
presently
since
sometime
soon
then
together
when
while
yet

Place

ahead
away
back
backwards
behind
down
down-stairs
here
in
inside
off
out
outdoors
outside
somewhere
there
upstairs
where

Manner

also
awfully
carefully
fast

how
sidewise
so
slowly
quickly
quietly
neatly
nicely
snugly
softly
usually
well
why

Degree

almost
along
besides
closely
easily
how
just
nearly
often
quite
pretty
though
too
very

Modal

no
not
surely
certainly
perhaps
indeed
probably
really
yes

Prepositions

about
above
across
after
against
among
around
as
at
before
behind
below
beside
between
by
for
in
if
into
instead of
of
over
on
since
through
to
under
underneath
up
upon
with
within
without

Conjunctions

and
because
but
neither
or
so
than
that
unless
until
whether

Interjections

ah
good-by
good-morning
good-night
gracious
hark
hello
how-do-you-do
hurrah
indeed
oh
pop
quack
whoa

Comments

It must be understood that the foregoing is a *child's vocabulary*. Necessarily the mental content is not that of an adult, quantitatively, though there seems small reason for doubting the qualitative identity. Children, even as adults, occasionally have wrong concepts, but as a rule their ideas are largely the ideas of the parents and are probably as nearly identical, at least, as would be those of two adults of unequal intellectual endowments.

Size: As Whipple has said, the general opinion as to the extent of a child's vocabulary is far astray. The request for a guess as to the vocabulary of a three-year-old was made of a large number of people. The highest guess was "not over 1,000;" the lowest guess was 50; the average of all the guesses was between 200 and 300. Parents were as far astray, usually, as were single people, though the guess of 1,000 was made by the mother of five-year-old twins. All seemed greatly surprised, some even incredulous ("from Missouri"), when told that B's vocabulary contained over 1,900 words.

Comparison: The only detailed vocabulary that is comparable with B's is that of Whipple's three-year-old boy. The relations of these two vocabularies is shown by the following table:

Different Parts of Speech, With Percentages

Observer	Age of Child	Sex	Total Words	Nouns	Pron.	Adj.	Verbs	Adv.	Prep.	Conj.	Int'j.
Whipple.....	3	M	1771	993	33	209	391	89	24	8	24
			%=	56.1	1.8	11.7	22.1	5.0	1.3	0.5	1.3
Bush........	3	F	1944	1042	50	214	506	75	33	11	14
			%=	53.5	2.6	10.9	26.0	3.9	1.7	0.5	0.7

The principal advantage the girl, B, has over the boy, R, seems to be in the use of verbs, she having a numerical excess of 115. In nouns, her excess is 49; in pronouns, 17; in adjectives, 5; in prepositions, 9; and in conjunctions, 3. The boy has an excess over the girl in adverbs of 14; and in interjections, of 10. This excess in interjections is a questionable one inasmuch as Whipple counts as legitimate such expletives as "choo," "hip," "pash," "why-senses," etc. The girl has a variety of expletives, but none except those commonly accepted were counted. Whipple included also such expressions as "fullest," "goeomes," "morowsky," "snootikins," and so on, words which certainly have no authoritative acceptation, and, hence, are not valid, even though interesting. It seems to me that a valid vocabulary should contain words of accepted usage only; and such words being those only which the child employs intelligently. This interpretation would exclude a number of words which Whipple has counted, such as numerals above five, unusual or original terms and expletives, and probably the names of the days of the week. But this elision in R's vocabulary would probably be compensated numerically by many other words not recorded but presumably known, such as " cake," " cheek," " father," " fire-engine," " large," " papa," " ran," etc. As to numerals, B can count correctly to twelve; but with her this is chiefly a knowledge of the correct sequence of counting sounds; her apperception of number is not clear as yet beyond the group of five.

A very interesting comparison between the vocabularies of R and B consists in the number of words common to both, and the number peculiar to each. There are about twelve hundred words which both use in common, about 570 that R uses that B does not, and about 750 that B uses that R does not.

Color sense: B has a very quick eye for color values, as is shown by her very quick assortment of the 64 shades of eight principal colors in the Montessori scheme, and by her appreciative comments on beautiful ribbons, pictures, and sunsets. Immediately and without hesitation she will correctly select and name the following: white, black, gray, tan, pink, violet, blue, green, yellow, orange, red and gold; less surely, browns, scarlet and purple. As Whipple remarks, this degree of color knowledge is above the average. It is due largely to the following: (a) favoring opportunities for learning colors, a condition not present in many homes; and (b) an eye sensitive to color. It should be more generally recognized that color delinquencies are largely due either to optical deficiencies or to relative color insensitiveness,—on the part of the parent or child or both. Any normal child of color sensitiveness equal to B's could probably be taught as many colors if the parents were diligent in carefully associating the correct color terms.

THE DEVELOPMENT OF PSYCHOLOGICAL CLINICS IN THE UNITED STATES

By Theodate L. Smith

Within the last decade, the terms clinical psychology and psychological clinic have become familiar but with a vagueness of meaning which leaves much to be desired. Psychological clinic has apparently been used to designate types of work ranging from a more or less mechanical and amateur application of the Binet-Simon tests to that of a well equipped laboratory where diagnosis is based not only upon mental tests of various kinds but upon as full a knowledge as possible of the heredity, environment, personal and family history of the patient and the possible correlation of these factors with mental and physical peculiarities. But the explanation of the psychological clinic and its work is to be best found in a description of its actual development. The following brief sketch makes no claim to completeness, but data thus far gathered are used to indicate the lines of development and possible future of an institution as yet only in the beginnings of its usefulness.

The first psychological clinic in the United States for the study of exceptional children was established by Professor Lightner Witmer of the University of Pennsylvania in connection with the psychological laboratory of that institution. While originally founded as a result of Dr. Witmer's interest in mentally and morally retarded children, its work is not limited to these but includes in its scope any child who deviates from the average, the precocious child and the genius as well as the mentally defective. As the work progressed, the need of some place where children could be kept under expert observation for longer or shorter periods of time became keenly felt and as a result, a special hospital school was established for the care and treatment of such children as seemed to need prolonged observation and training in order to arrive at a satisfactory diagnosis of their mental status.

Children may be kept here under training for any period ranging from a few days to six months, or even in some cases a year.

The second psychological laboratory to be established in the United States developed under quite different auspices. In 1898 Dr. R. T. Wylie, a physician and psychologist, received an appointment at the State Institution for the Feeble-Minded at Faribault, Minn. In the intervals of other work, Dr. Wylie devoted himself to making psychological tests of the children in the institution. In 1900, the Faribault laboratory was provided with seven rooms for research and clinical work, including not only psychology but bacteriology, facilities for photography and a fair equipment of apparatus. Dr. Wylie made studies of sensory acuity and ergograph and memory tests, in the intervals of other work, and these early experiments have now led to the establishment of a regular department of research under the direction of Dr. Fred Kuhlmann, who devotes his entire time to systematic and intensive studies of the children in the institution.

In 1905, as a result of persistent efforts on the part of Mr. Johnstone, Superintendent of the Training School for Feeble-Minded at Vineland, N. J., a department of research was established there, which is supported by private endowment and contributions quite separate from the funds of the institution. Dr. Henry H. Goddard was appointed psychologist and under his direction the work has steadily increased in extent and importance.

From the first he has worked toward the idea of obtaining as complete information as possible of each child during his lifetime and supplementing this by the findings of an autopsy, whenever this was permitted. The physical, mental and social traits of each patient are studied and his ancestry traced as far back as possible in both direct and collateral lines. The Institute of Anatomy at Philadelphia has given its aid in the matter of autopsies though as yet these have been comparatively few in number. The staff of the department has been steadily increased as funds permitted and in 1912 consisted of the director and eight assistants. Three of the latter are employed in the field work of collecting family histories while the remainder devote their time to the work of testing and observing children, doing the routine work of care taking, and working out a system of classification. In 1909, a division of medical research was established and a physician appointed who devotes practically her entire time to research in this field. A complete physical examination is made of every child at the time of his entrance to the school and periodically afterwards. Wasserman, tuberculin, blood tests and urine analyses are made, and experiments in feeding thyroid and other glandular extracts to certain groups of children have been tried. In 1912 a department of biochemistry, with a working force of a director and two assistants was added to the staff already employed. Members of the general staff are sometimes sent to other institutions to conduct tests and in 1912, two of them were sent to Ellis Island to conduct an experiment extending over several months. Their aim was, first to find out whether it was possible for trained experts to pick out mental defectives by observation as they passed through the receiving station, and secondly to apply Binet and other tests to the selected cases later, the real object being to find the per cent of mental defectives among the immigrants.

In 1909, there was a rapid development in the field of applied psychology and a number of psychological clinics were established. A new phase of the work was inaugurated by the Juvenile Psychopathic Institute of Chicago. This was founded by private philanthropy for the purpose of conducting research work in connection with the problems of juvenile delinquency. Dr. William Healy, a neurologist who had already had experience as medical examiner for the juvenile court was selected as director and Dr. Grace Fernald as psychological assistant. An arrangement was made with the officials of the juvenile court in accordance with which doubtful cases are sent to the clinic for examination and a diagnosis is made before action is taken by the court. A series of tests used in the clinic have been published by Dr. Healy and Dr. Fernald.

In this same year, 1909, a psychological clinic for the examination of exceptional children was established at Clark University as a department of the Children's Institute. This clinic offered free diagnosis, and advice as to institutions and methods of dealing with the various cases but undertook no treatment or provision for patients during examination if this was prolonged. To some extent, it has coöperated with the public schools, as cases have been brought from the schools for examination and children in the special classes have also been tested.

At about the same time, the universities of Minnesota and Washington introduced clinical work in connection with the departments of psychology and education and, in both cases, this has resulted in the establishment of a permanent clinic. At the University of Washington this has taken the form of an endowed foundation for Child Welfare, known as the Bailey and Babette Gatzert Foundation for Child Welfare, for which $30,000 was bequeathed on the following conditions: "that the said sum of money shall be safely invested by the trustees in interest bearing securities and the income thereof shall be used to maintain a bureau of child welfare in the department of education of the University of Washington, the work of said bureau to consist in the promotion in various ways of education for the better care and treatment of children suffering from defects either mentally or physically, especially such defective children as can, in spite of their defects, attend school of some sort and benefit by some form of school education and training . . . said bureau to be at all times in charge of a competent expert, and any expense in maintaining the bureau in excess of such income to be provided out of university or other funds."

In 1911, Dr. Stevenson Smith was appointed as director of the Foundation, which ranks as a university professorship. He conducts two clinics which are primarily for the examination of school children, one at the university in connection with the department of orthogenics and one at a public school in connection with the special classes. Individual training and investigation of cases is extensively carried on by students in the department under supervision of the director. Corrective training for children with speech defects is given in daily classes. The Foundation is also affiliated with the juvenile court, its director acting as psychologist of the juvenile court in coöperation with Dr. Merrill, the director of the department of diagnosis of the court. This department investigates every child brought into court on a delinquency charge. He is examined as to his physical and mental condition and as complete an investigation as possible is made of his personal, family, and social history. A detention home affords opportunity for a continued observation of the mental and physical condition of difficult cases.

During the year 1913, 1,186 children were examined at this clinic. In 906 cases, the findings were negative as regards mental or physical defects, 111 were found to be mentally defective. In addition to this there were found 131 cases of functional neurosis, 29 cases of physical precocity, 7 of moral deficiency and two of psychosis.

In answer to questions as to the value of this department of diagnosis to the juvenile court, Judge Frater states that "two years of continuous demonstration has proven its usefulness . . . the scientific study of a child's physical and mental condition prior to the court hearing is of undoubted value, provided the study is made by an educated and experienced diagnostician and the judge presiding in the court is sympathetically interested in his work and knows enough to apply common-sense methods in the adjustment of the various conditions which scientific inquiry cause to be presented to him."

In the University of Minnesota, a clinic for the study of irregular mental conditions was organized as a section of the psychological department. The medical examinations are in charge of Dr. J. P. Sedgwick of the medical college which coöperates with Dr. Miner and Dr. Woodrow of the psychological department. The work has also had the assistance of Dr. Fred Kuhlmann, who is director of the research work at the Minnesota State School for the Feeble-Minded. Diagnosis of the mental and physical condition of patients is made by the clinic and treatment and methods of training are suggested and carried out under its direction. The clinic coöperates with the juvenile court and Juvenile Protective League of Minneapolis and the public schools.

The university offers a course of three hours a week throughout the year, for the study of mental retardation, which is especially designed for those who are contemplating teaching. In connection with the work of the juvenile court, a valuable collection of case records is being accumulated in which attention is given to the physical, mental, moral, educational and social factors. Two rooms in the court house have been assigned for the use of the clinic and the superintendent of schools and teachers of the ungraded classes coöperate in furnishing data.

More recently psychological clinics have been established at the universities of Pittsburgh and Iowa and some clinical work is done at Cornell and Tulane.

In 1912, the University of Pittsburgh instituted a department of clinical psychology for diagnosis and classification of cases which presented deviations from the normal and for the training of teachers and workers in schools and institutions for mentally defective and backward children. The clinic is under the direction of Dr. J. E. Wallin and is " at the service of parents, teachers, physicians and social workers and schools throughout the state." The university offers five courses in clinical psychology, three extending throughout the entire year and two of one semester each. Supplementary courses in child study and education are given in other departments.

In 1913, a psychological clinic was established in the State University of Iowa as a branch of the psychological laboratory with Dr. R. H. Sylvester as clinical psychologist. It coöperates with the medical school and departments of education. A new feature is introduced by the fact that Dr. Sylvester accepts three day invitations to other cities to examine children and it is hoped that this may pave the way for the introduction of psychologists as a regular part of the school systems of the state. The clinic will devote special attention to the treatment of speech defects, a line in which Dr. Fletcher of Tulane University and formerly in charge of the Clark Clinic is also an expert.

At Cornell, the educational laboratory under the direction of Dr. Whipple is to test selected cases at the George Junior Republic, which is located within an easily accessible distance from Cornell.

Owing to the difficulty of obtaining appropriations, state institutions for the feeble-minded have been slow in following the example set by Minnesota. Since the work initiated by Dr. Wylie in 1898 no state appointments were made until 1909 when Dr. Edmund Huey* was appointed psychologist at the State Institution for Feeble-Minded at Lincoln, Ill. His clinical studies in the psychology of defectives, published under the title of "Backward and Feeble-Minded Children," is a record of his valuable work during his comparatively brief stay at Lincoln before he was called to Johns Hopkins as assistant in psychiatry at the Phipps Clinic, where a most promising field of work was opening. He was succeeded at Lincoln by Dr. Clara Harrison Towne.

In 1910 Dr. P. F. Lange received an appointment at the Iowa State Institution for the Feeble-Minded and a Psychological Clinic was inaugurated at the Women's Medical College at Philadelphia. In both of these institutions, however, there has been a suspension of the work in consequence of the directors being called to other positions.

Several psychopathic clinics have recently been opened in connection with hospitals but are of too recent date to furnish reports of the work accomplished. The New York Post Graduate Medical School and Hospital established a clinic for the examination of defective children under the name of Clearing House for Defectives, in 1912, of which Dr. Max Schlapp is director and there is also a clinic directed by Dr. Samuel B. Heckman at the Hospital of the City of New York.

A clinic for out-patients is held at the Boston Psychopathic Hospital which has been available for cases brought by social workers and others and Dr. V. V. Anderson, assistant physician at the clinic, has recently been appointed to assist the probation officers of the Municipal Criminal Court.

In a somewhat different field is the development of psychological clinics in connection with reformatory institutions. In 1912 at the Bedford Reformatory for Women, there was established a Bureau of Social Hygiene for the purpose of studying the lives and needs of the inmates, who are young women between the ages of sixteen and thirty years. The special problem of this laboratory is the study of the conditions which have led to prostitution and commitment of the girls in the reformatory, in order to prescribe for their treatment and rehabilitation. It has three departments, psychology, sociology and nervous pathology, carried on by an able staff of workers under the direction of Dr. Katharine Bement Davis, Superintendent of the Reformatory since its foundation in 1901, and recently appointed Commissioner of Correction in New York City. This laboratory is financed by the Rockefeller Bureau of Social Hygiene, but even before its establishment, Bedford Reformatory was widely known as an experiment station for the scientific study of the causes and treatment of delinquency among women and girls.

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* Deceased Dec. 30, 1913.

Within the past year, the Board of Trustees of the State Home for Girls at Trenton, N. J., has established a department of psychological research based upon child study. Mental capacity is tested, the history of each girl admitted to the home is obtained as fully as possible, an examination and record of her physical condition made and a diagnosis is based upon these three factors. It is hoped that this may ultimately lead to the weeding out and transference to other institutions of the feeble-minded and those of an insane diathesis, so that the efforts of the home may be entirely devoted to the training of girls of normal mentality.

The Philadelphia House of Detention for Children also has a clinic under the direction of Dr. Walter Cornell and this last year the Preston School of Industry has engaged Mr. Fred. Allen to give Binet and other mental tests to all cases suspected of defective mentality. Although no appropriation has yet been made for a permanent clinic, it is hoped that the work now being done will lead to this in the near future.

Clinical work is also done at the Men's Reformatory in Indiana and mental tests are being systematically given in a number of institutions which have no regular clinic.

In connection with the public schools, the value of the psychological clinic as a part of the school system is beginning to receive recognition. In the spring of 1909 the legislature of California passed a law establishing "Health and Development Supervision" in the public schools of the state. One section of this law provided for "the adjustment of school activities to health and growth needs and development processes of pupils" and another for "the study of mental retardation and deviation of pupils in the schools." Although the law was permissive and not mandatory, eleven cities, of which Los Angeles was the first, soon established more or less complete health and development supervision under its provisions. The most complete organization is in Los Angeles where the Department of Educational and Clinical Psychology of which Dr. George Leslie is director, has a finely equipped laboratory and receives equal recognition with the School Health Department both as to authority and salaries. One other city, Oakland, has a psychological clinic, which was established somewhat later and is not yet as fully organized as the Los Angeles clinic.

In the fall of 1913, a medico-psychological laboratory was opened in Albany as a part of the system of health direction under Dr. Clinton P. McCord. This has quarters in the city hall in connection with the director's office where all children in or candidates for the special classes are examined before transfer is made. Transfers to and from the special classes are made only by recommendation of the health director. The director is a physician who has had psychological training and was formerly assistant in the Medical Research Department at the Vineland Training School for Feeble-Minded. The form board, Binet, De Sanctis and other tests are used. Teachers of the special classes fill out descriptive blanks and the school nurses assist in securing sociological data. A dental clinic is soon to be added and it is hoped that, as the work expands, a psychologist who will devote his entire time to the mental development side of the work may be included as a regular part of the system.

Rochester, in 1906, began to feel the pressing need of relieving the regular classes from some of the most pronounced cases of subnormality and a special class was formed which was speedily followed by several similar classes in the same year. The relief and benefit to the teachers and normal children was so great that a director was appointed to examine children and organize classes for the care and training of the retarded children. At the same time, a special medical inspector was appointed by the Health Bureau whose work was to study the relation of physical to mental defects. These two officers coöperated in the examination of children by both physical and mental tests. Various tests were at first used and many of them, but the labor of the detailed work soon became so great that in 1909 a Binet examiner was appointed and the Binet scale adopted by the board as a preliminary test. Any child testing three years or more below age is referred to the laboratory as a subject for special study and investigation. At no time has the Binet test been used as conclusive evidence of subnormality, but it furnishes a most useful instrument for singling out cases for more careful study.

In Hartford, since 1912 Dr. George Dawson, who had previously devoted much time to the study of difficult children in the schools, has held the official position of examiner for one school district, giving two half-days in the week to the work of examining pupils who for any reason appeared to be misfits in the school system. In 1913, he was appointed to do similar work in Springfield, devoting to it one day in the week. Inadequate as is this beginning, the value of the work will probably lead to the recognition of the needs of a psychologist to devote his entire time to this work.

In this connection, it is interesting to note that the London County Council at a meeting of the Education Committee held in June, 1912, appointed a psychologist to examine all pupils recommended by teachers for the special schools. He gives half his time and receives a salary of £300. The appointment is for three years.

Although the psychological clinic is as yet in its infancy, the work already accomplished gives great promise for the future. The clinics already established, though all having as their ultimate aim the welfare of the child, have developed along different lines, each corresponding to a social need. As centres of development, the university, institutions for feebleminded, juvenile courts and reformatories and the public school have all played their part. In the university, the primary emphasis is naturally more upon the side of research than practical application. In institutions for the feebleminded, in the public school and in connection with the problems arising from juvenile delinquency, the practical side is the more pressing though until further progress has been made, research must form an important part of the work. The studies of Ayres, Thorndike, and others have shown us the great amount of retardation among the pupils of our public schools and the consequent waste of public money, but the proportion of this which is due to native deficiency and that which is due to remediable causes are still problems to be investigated. For the sake of the teacher, the other pupils and the child himself, actual mental defectives should be removed from the regular classes of the public schools. They are not only a drag upon the progress of the class but take an undue proportion of the teacher's time, frequently exercise a demoralizing influence upon the rest of the class, and not only receive no benefit themselves but lose the opportunity of development for such usefulness as is within their capabilities. Children who under the influence of the training and supervision provided by special institutions might become, at least, partially self-supporting and contented members of a community are thus allowed to degenerate and become a menace to society, until some overt act, for which they are not morally responsible, brings them into court and under legal control. In the few cities which have already introduced psychological clinics into the school system, their value has been recognized both as a means of relieving the schools from the feeble-minded and of aiding in the solution of problems arising from difficult cases of misfits in which there is no actual mental defect and sometimes an unusually high degree of mental endowment.

It is at precisely this point that a very real danger should be avoided. The whole subject of mental tests is at present in so unsettled a condition that no one but an expert psychologist with additional clinical training and in conjunction with a medical examiner with experience in work with children should be allowed to make a diagnosis upon which a child's whole future depends. It may be a useful and valuable addition to a teacher's training to acquire the technique of giving the Binet and other tests and such training may be of practical service in helping to grade normal pupils or as corroborative evidence in cases of gross mental defect; but the psychological clinic as a part of the school system should be directed only by experts trained for the work, whose case records, even if they themselves have not time for the analysis and working up of them, will furnish valuable material for scientific research. If it is objected that such experts would be too great a financial burden for the school system, it may be pointed out that the present actual expenditure for repeaters, which might be saved by the elimination of the unfit and adjustment of the misfits through the work of a clinic, would pay the salaries of several experts.

In the juvenile courts and institutions for delinquents, the value of the psychological clinic has already received demonstration. It is obvious that the presence in institutions of morally irresponsible delinquents render the problems of discipline and training almost insoluble. Methods which are most successful with those susceptible to reform are evidently inapplicable to cases where direct restraint is the only means of supplying the control of which they themselves are incapable. It is equally obvious that the best and most economical way of meeting this difficulty is through the winnowing process of the court clinic, by means of which mentally deficient delinquents may be separated from the mentally normal and provided for in institutions suited to their needs.

Here again there is need for research and practical workers to join hands, for the determination of border line cases is a problem in which psychology must as yet admit its inadequacy, and in its solution, the laboratory, the clinic and the social worker must coöperate. Here such work as that of the Bedford laboratory is of the greatest value and the application of tests more or less standardized to reformatory inmates furnishes data for further work. Germany is already making use of the *Beobachtungsanstalt* for determining the treatment of juvenile delinquents, and with the aid of the clinic our detention homes could well be transformed into similar institutions.

In the schools for the feeble-minded, the value of the clinic is twofold for in addition to having the most fruitful field for research, it furnishes practical aid in the classification of the children according to the mental grades and types. From this brief review of the development of psychological clinics it is evident that there is a demand upon universities to furnish courses for the adequate training of specialists in what is rapidly becoming a new profession. Such training should include thorough drill in the scientific methods and technique of the psychological laboratory, courses in general, social, educational and child psychology, special courses in the psychology of defectives and delinquency and practical experience in the technique of giving mental tests. A knowledge of the development of child welfare institutions in the United States and other countries and a general course in sociology should also be included, to give orientation in the broader aspects of the work. While a few universities are beginning this work, there is need not only for an extension of the courses in the university but for organized coöperation with institutions, so that academic training may be supplemented by practice in clinical work and observation of typical cases.

BOOK NOTES

The mental and physical life of school children. By PETER SANDIFORD. London, Longmans, Green & Co., 1913. 346 p.

The purpose of this book is to present a comprehensive account of child nature for the use of students in training colleges, and is based on the author's experience for seven years with students in England and America. It is meant to be a textbook, giving in the smallest space the largest number of facts. Under the child's physical life the author discusses heredity, growth statistics and health. He then considers the physiological basis of mental life, the evolution of the nervous system, its constitution, the functions, the senses. Under dynamic and functional psychology he discusses instincts, capacities, health, habit, association, memory, suggestion, imitation, attention and interest. Under descriptive psychology come perception, imagination and emotions. Then comes the psychology of babyhood and adolescence, the exceptional school-child, and finally, in discussing psychology of a special subject he takes up the problem of language in children. It seems to us the author has very little perspective in his work. His purview, as far as we can see, seems to be limited to English writers and he has a kind of pedagogic encyclopedism that makes anything, from the paramecium to statistical methods, optical illusions or problems in arithmetic, in place. The book is not well printed or bound, but nevertheless has its good points and cannot fail to be suggestive.

The demonstration schools record, number two; edited by J. J. FINDLAY. Manchester, University Press, 1913. 283 p.

This volume is a record of work done in connection with the Fielden demonstration school and is the second in a series begun in 1908. The first volume merely explained what a demonstration school stood for, with a few contributions to the curricula to illustrate how staff and students might get acquainted with pedagogic problems in a concrete way. Since the first report a seminary has been organized which brings the school into contact with university pedagogy. All the discussions and reports of this class are designed to improve the work of the school. The volume contains fifteen papers on such topics as corporate life, with notes on school management, work and motives for working, general review of school pursuits, humanities, essay and syllabus for five classes, arts and crafts (essay and syllabus), hand-writing, with notes on reading and composition, English literature, course in singing, modern languages, natural science, mathematics, arithmetic, plane geometry.

Educational psychology. Volume two. The psychology of learning. By EDWARD L. THORNDIKE. N. Y., Teachers College, Columbia University, 1913. 452 p.

"This volume presents the result of psychological studies of human learning and organizes and interprets them for students' use. It is not a complete summary and criticism of the experimental work in this topic, for such a summary and criticism would be too heterogeneous and too complicated by intricacies of method and argument. On the other hand, it is not a dogmatic account of the facts as I myself see and judge them." This volume treats of laws of learning in animals, associative learning in man, learning in man, learning by analysis and selection, mental functions, their development by practice, the amount, rate and limit of improvement, its factors and conditions, changes in rate, permanence of improvement, improvement in informational, associative, analytical and selective functions, and finally, the influence of improvement in one mental function upon the efficiency of other functions, concluding with a bibliography.

School health administration. By Louis W. Rapeer. New York, Teachers College, Columbia University, 1913. 360 p.

This is a dissertation designed to find and show what the American cities are doing for national health and vitality through the agency of the public schools, and how the work may be made more efficient and useful in solving our individual and national health problems. The investigation began with the practice of this work by the author when he was a school principal in Minneapolis, and has been continued by data collected by the Child Hygiene Department of the Russell Sage Foundation. In part one the author discusses national and school health problems and how they are being met; (2) a study of twenty-five cities as to the general phases of health administration, nature and efficiency of the work done, ailments and physical defects of school children, common and non-infectious ailments, communicable troubles, special phases of medical inspection; while part 3 deals with a tentative standard plan of medical examination. The book contains many interesting tables and marks a real contribution to our subject.

Young working girls. A summary of evidence from two thousand social workers. Edited for the National Federation of Settlements by Robert A. Woods and Albert J. Kennedy, its secretaries; with an introduction by Jane Addams, its first president. Boston, Houghton Mifflin Co., 1913. 185 p.

The inquiry which this volume reports was undertaken immediately after the formation of the National Federation of Settlements in 1911, and seeks to bring together the results of settlement experience in specific directions. The baffling problem of the adolescent girl of the tenement house, city factory and department store is keenly felt. The chief topics considered are, preparation for industry, entrance upon it, new attitudes toward home and neighborhood, inadequate home life, a better family setting, morality of sex, recreation and character, forms of constructive recreation, elements of good club work, mixed clubs of boys and girls, education in realities, preparation for womanhood, a provisional platform.

Medical and sanitary inspection of schools, for the health officers, the physician, the nurse and the teacher. By S. W. Newmayer. Ill. with 71 engravings and 14 full-page plates. Philadelphia, Lea & Febiger, 1913. 318 p.

This volume represents an effort to prepare for physicians, nurses and teachers a guide to the physical examination of school children. The author aims not only to outline a plan of what and how such work can be best performed, but also to develop a deeper appreciation of the relations of physical and mental development. Medical inspection of schools has far more than justified its existence. The work is divided into four parts, (1) administration, (2) school buildings and grounds, (3) infectious, contagious, and communicable diseases, (4) physical defects. The book is quite copiously illustrated and is also very practical in that it gives directions about passing examinations and testing mentally defective children, etc.

De la méthode littéraire; journal d'un Professeur dans une Classe de Première. Par J. BEZARD. Paris, Librairie Vuibert, n. d. 2nd ed. 746 p.

In the first part, under the title, the origins of classic reason, the author discusses the nascent ambitions of science and the limits imposed to it by Pascal. In the second part, entitled the classic spirit in the 18th century, he discusses the arts of observation, composing and writing. Under the third part, entitled the processes of reason in society, he gives us 16 interesting chapters on prominent men and literary movements. In the fourth part, entitled romanticism and evolution, he discusses the errors of classic reason, the origin of romanticism, Rousseau, first symptoms of the revolution, and romanticism as its result. The fifth part takes up romanticism and realism, discussing the romantic elegy and drama, the literature of to-day, science and poetry, history, relations of romance to the theatre. The points of view represented by the author are original, his book is interesting, and one is inclined to wonder whether its translation into English would not be a profitable venture.

Foods and household management; a textbook of the household arts. By HELEN KINNE and ANNA M. COOLEY. N. Y., Macmillan, 1914. 401 p.

This volume, like its companion, "Shelter and Clothing," is intended for the course in household arts in high and normal schools, whether the work be vocational or general. It treats specifically of foods, their preparation, sanitation, cost, nutritive value, serving,—these topics being interwoven with the practical aspects of household management, and followed by a study of budget accounts, methods of buying, housewifery, with 160 recipes, many cooking exercises, designed to develop initiative and resourcefulness just as "Shelter and Clothing" deals with the organization and ideals of the home, household sanitation and decoration, furnishing, and treats in full textiles, sewing, costume designing and dressmaking. This volume contains about 80 cuts.

The Montessori method and the American school. By FLORENCE ELIZABETH WARD. N. Y., Macmillan, 1913. 243 p.

The author's aim is to offer those who have practical interest in its intimate details some of the impressions received from an investigation of the Montessori method at first hand, as well as some results of experiments made among children with whom the author works daily. These talks are epitomes of discussions conducted with classes. Generally reforms come slowly, but the Montessori movement seems likely to be an exception. Thus the author first treats the evolution of the method, her impressions, freedom, the basal principle, the child's world of objects, the language, oral and written, practical developments, mediums of self-expression, oldest agency of early education, the home, other articles on early education, etc.

Advanced English grammar. By William T. Harris. Yonkers-on-Hudson, World Book Co., 1912. 511 p.

In preparing this treatise, the author desired to make this most useful branch of study both pleasant and effective by a systematic, orderly presentation, and we are assured that the work is in strict accordance with the best pedagogical thought and practice. The inductive method is employed, and the student is called on to cultivate the power of thoughtful observation. He has to see, to know, to do, and is thrown upon his own resources. The book as it stands certainly needs explanation. We are left to infer that the author is William T. Harris, late head of the Bureau of Education, but the writer of this note has no knowledge that he ever devoted any such special attention to this subject. Moreover, the book here appears with no intimation that the author died some years ago.

Hygiene for girls; individual and community. By Florence Harvey Richards. Boston, D. C. Heath & Co., 1913. 257 p.

The author thinks modern text-books on physiology contain too much physiology and not enough practical hygiene, and seeks to remedy this error. First comes individual hygiene, of muscles, bones, excretions, circulation, digestion, respiration, nerves, with a few experiments; second, community hygiene, dealing with germ diseases, tuberculosis, vaccination, anti-toxine, narcotics, alcohol, patent medicines, public works, emergencies; with a final part on the reproductive system, with sex hygiene. The book is copiously illustrated with over 150 well chosen cuts, and is an admirable specimen of judiciousness in selection and of condensation in the presentation of the themes.

Young boys and boarding school; the functions, organization and administration of the sub-preparatory boarding-school for boys. By Horace Holden. Boston, Richard G. Badger, 1913. 197 p.

This book is based on a thesis in 1909, required in the graduate course at Harvard, although it is here developed and matured. The author discusses first the lower school, and then gives a chapter each to the boy from seven to fourteen, physical, intellectual, moral, social education, the day's work, the curriculum, personnel of the staff, location and equipment, the economics of the school, and special problems in it. It is an interesting, up-to-date and practical book. The author has availed himself pretty well of most of the sources of information upon the subject he treats in English but does not appear to have gone much outside.

Psychologie der Sprachpädagogik; Versuche zu einer Darstellung der Prinzipien des fremdsprachlichen Unterrichts auf Grund der psychologischen Natur der Sprache. Von. Chr. B. Flagstad. Leipzig, B. G. Teubner, 1913. 370 p.

The first chapter, on the reconstruction of words, discusses the nature of the apprehension of sound, then of the language sounds. The second section takes up the enlargement of the natural word ideas, then comes the consideration of the development of language as an expression of a mental content, and here first the speech mechanism, then the form and content, then the word structure is discussed. Third comes the relation of language to the whole psychic life, the relations of the word to other conscious content and ideas, the significance of the life of feeling in language, and the work closes with a consideration of the will and the development of speech.

Principles of education. By T. Raymont. London, Longmans, Green, 1913. 381 p.

The writer here treats, first, the machinery, second, the object, third the means of education, the latter including the choice of studies, scope of the school, some maxims of methodical procedure, origins of studies and sequences of lessons, correlation of studies, processes and devices of teaching, influence of public examinations, etc. The last or fifth part, on the means of education, discusses the problems of teaching, the authority and influence of the teacher, and the influence of school on society.

Young folks handbook. Philadelphia, American Institute of Child Life, 1913. 215 p.

The American Institute of Child Life, which has developed from the After School Club, is passing through an interesting if not critical stage of its existence. With the advent of Dr. Byron Forbush as its head, its scope became enlarged, its aim elevated, and without doubt its usefulness increased. The monographs now appearing under his editorship are most of them admirably calculated to be of practical service to parents, teachers and child workers. We sincerely hope that the Institute will not be tainted with commercialism.

Intensive studies in American literature. By Alma Blount. New York, Macmillan, 1914. 331 p.

The topics here discussed are, what literature is, forms of poetry, meter, stanza, rhyme, kinds of poetry, melody and harmony, the sentence, loose, periodic and inverted, diction, figures of speech, and various qualities of style and kinds of writing. Part two, intensive studies, beginning page 101, takes up selections from Irving, Bryant, Poe, Wadsworth, Longfellow, Whittier, Lowell, Holmes, Lanier, Walt Whitman and Emerson. There are 19 full page illustrations in the text.

Chinese womanhood. By Lucinda Pearl Boggs. Cincinnati, Jennings & Graham, 1913. 129 p.

The author, a Ph. D. of the University of Illinois in psychology and education, has lately spent some time in China and sets down the results of her thoughts and observations on womanhood, the mother, the wife, the priestess, illustrious women of China, education of women, Western civilization and Chinese women.

The marking system in theory and practice. By I. E. Finkelstein. (Educational Psychology Monographs, no. 10.) Baltimore, Warwick & York, 1913. 88 p.

This is an interesting study of marks at Cornell in 1902-03 and 1911, discussing distribution, variations by change of instructor, typical distribution of high and low marks, peculiarities of distribution of other causes, the marking system in the college of law, etc., all illustrated with 20 diagrams.

The examination of school children; a manual of directions and norms. By William Henry Pyle. New York, Macmillan, 1913. 70 p.

The object of this manual is to provide in finished form for teachers directions for the examination of school children and a table of norms for various ages. No originality is claimed for the tests. It is a very convenient and condensed paper.

Elements of debating. By Leverett S. Lyon. Chicago, University of Chicago Press, 1913. 136 p.

This book attempts no originality but presents the elements of forensics largely freed from technicalities for the benefit of high school and college beginners. It characterizes and defines argument, debate, the requisites of success, making and proving the issue, the brief, refutation, management of the debate, how and where to read, a typical college forensic, material.

Paedologisch Jaarboek, volume 8. Edited by M. C. Schuyten. Paris, Librairie C. Reinwald, 1913.

This volume contains nine important articles and some scores of reviews and shorter articles, with a very full bibliography. It is a pity that at least an epitome of the articles could not be published in English, French, or German.

A cyclopedia of education. Volume 5. Edited by Paul Monroe. N. Y., Macmillan, 1913. 892 p.

Professor Monroe is to be congratulated on bringing this important work to a close with this fifth volume, which will long remain unique in English pedagogical literature. It is a work to which every teacher ought to have access and to which all thinking teachers will.

Die Erkennung des Schwachsinns beim Kinde. Von Emil Villiger. Leipzig, Wilhelm Engelmann, 1913. 90 p.

The French verb; its forms and tense uses. By William A. Nitze and Ernest H. Wilkins. Chicago, University of Chicago Press, 1914. 40 p. (With French verb blanks.)

Trans-Atlantic historical solidarity. Lectures delivered before the University of Oxford in Easter and Trinity terms, 1913. By Charles Francis Adams. Oxford, Clarendon Press, 1913. 184 p.

Linking the life insurance companies to the public health movement. By Eugene Lyman Fisk. (Read before the Reed College Conference on Conservation of Human Life, Portland, Ore., May 9, 1913.) 8 p.

Concrete investigation of the material of English spelling; with conclusions bearing on the problem of teaching spelling. By W. Franklin Jones. Vermillion, S. D., University of South Dakota. 27 p.

Panama canal; what it is and what it means. By John Barrett. Washington, D. C., Pan American Union, 1913. 120 p.

The Pan American Union; peace, friendship, commerce. By John Barrett, 1911. 253 p.

Table talk in the home. By the Literary staff of the institute. Monograph of the American Institute of Child Life. Philadelphia, 1913. 16 p.

Calendar of childhood and youth. Prepared by William Byron Forbush and the educational staff of the American Institute of Child Life. Philadelphia, American Institute of Child Life, 1913. 59 p.

Theodate Louise Smith

It is the painful duty of the editors of this Journal to announce the death of Dr. Theodate L. Smith, Librarian of the Children's Institute at Clark University, and a frequent and able contributor to the PEDAGOGICAL SEMINARY. Dr. Smith was actively engaged in her work and apparently in her usual health until February 15th, and died on February 16th. This is not the place to give any extended account of her life and character; but this Journal wishes to acknowledge its great indebtedness to her and to express its appreciation of her extended services in the cause of child welfare.

Dr. Smith was born in Hallowell, Maine, April 9, 1860; had received the A. B. and A. M. degrees from Smith College; the Ph.D. degree from Yale; and was a student at Clark University, 1895-96; research assistant to President Hall from 1902 to 1909; and since that date Lecturer and Librarian in the Children's Institute.

In connection with her work in the Children's Institute Dr. Smith had collected a large and valuable mass of material in regard to child welfare institutions of various kinds; and she placed this and her own extended knowledge at the service of everyone. Her devotion to the study of children was only surpassed perhaps by her love for the individual children of her acquaintance.

As a scholar, thoroughgoing and widely read; as a psychologist and student of childhood, sane and conservative; as a teacher, clear and straightforward; as a colleague, modest, helpful and generous; one did not always realize the scope of her accomplishments on account of the fact that her training was so well balanced. Dr. Smith was not only a thorough scholar, an expert in child welfare, a writer of ability and an efficient worker, but a woman of great poise, commonsense, and an embodiment of the sturdy virtues of the native New England type. Without hair-brained enthusiasm of the reformer as such, or the truculent militancy of the volunteer, she had the virtues of the professional soldier and was ready not only at any time to respond to any call to attack any strategic point, but also to perform the routine work of garrison duty day after day, and week after week. In this continued service she rendered aid to research students, teachers, mothers, child welfare workers, and indirectly to children; and literally, those who knew her; and figuratively those who had profited by her services, but did not know her, mourn her loss as irreparable. Any extended eulogy of such a worker seems both unnecessary and unbecoming; but the PEDAGOGICAL SEMINARY hopes to print later a bibliography of Dr. Smith's published writings.

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A CONTRIBUTION TO THE PEDAGOGY OF ARITHMETIC*

By ERNEST C. McDOUGLE,
Clark University

I. INTRODUCTION

Nearly three centuries ago Comenius undertook to give a method to teaching. At the present time there is a widespread movement through Experimental Education to establish it upon a sound scientific basis. Much that now finds acceptance in both curriculum and didactic procedure has found a place through conservative respect to traditional philosophies and dogmas of the past, coupled with some later empirical and pragmatic considerations. The present critical studies and experiments are concerned with both the subjects in the curricula and the methods of instruction. In these researches many laboratories have been busy, many investigators have been active, and much helpful work has been done. It is now necessary that the results should be brought together and put into usable form. Experimental Psychology has been too busy in exploring many fertile fields, as yet, to give attention to the full bearing of its discoveries upon Didactics, while Experimental Pedagogy is frequently too empirical to be scientific. For these reasons it is essential that the synthesist should bring together the modern needs of Pedagogy and the contributions of Experimental Psychology germane to the processes of learning, and state in clear and simple language the norms of method so the average teacher, who possesses little or no technical nomenclature of the psychological laboratory, or even of the experimental pedagogist, may find assistance in the daily routine of school duties.

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It is the purpose of this research to bring together many of the recent tests and experiments in Arithmetic and, in connection with conclusions drawn from them bearing upon better texts and methods, to evaluate them for practical use in the regular school work.

II. Brief Historic Sketch of Arithmetic

Arithmetic is the oldest science developed by man. As an art it runs much farther back into antiquity. Its first use is so remote that it is difficult to separate the mythical from the real. Anthropological investigations have brought much helpful material to light and the historical genesis of Arithmetic is coming to be better understood.

Callisthenes found in Babylon, in 331 B. C., when Alexander the Great captured the city, burned brick astronomical records running back to 2234 B. C. These were sent to Aristotle, according to Porphyry. In Egypt no uncivilized state of society has been found. Their oldest mathematical books date back to 3400 B. C., although Josephus (62, chap. 7, p. 50) gives Abraham credit for introducing Arithmetic into Egypt, when he says:

> "He communicated to them Arithmetic and delivered to them the science of Astronomy, for before Abram came into Egypt they were unacquainted with those parts of learning, and that science came from the Chaldeans into Egypt, and from thence to the Greeks also."

Among the Greeks and Romans, as well as among most primitive peoples, systems of counting were clumsy and imperfect, and it became necessary to invent symbols for numbers and systems of numeration for the practical use of these symbols. Counting-boards and the abacus were early invented and have persisted down to the present time. We find the Chinese and Japanese (64, 179) using the *swan-pan* and the *soroban* very generally even to-day. It is of historic interest to note that the first printed Arithmetic, published at Treviso, near Venice, was entitled "The Art of the Abacus for Arithmetic." Because of their awkward number symbols the Romans used calculating-boards for computations and employed their symbols only in stating results. The process of calculation derives its name from the Latin, *calculus,* "pebble," since pebbles were used as counters by many people around the Mediterranean.

The so-called Arabic characters are more properly Hindu. Leonardo of Pisa, in 1200 A. D., obtained them from the Moors and two years later he published a system of computation using them. As he had obtained the characters from the Arabs they received the name Arabic. They have been traced, however, to the Hindus. After their introduction into Europe, a long contest ensued between the abacists and the algorists, but the Hindu system gradually spread over the continent and was well known by 1400 A. D. Merchants discarded the Roman notation in 1550 and the monasteries and colleges followed a century later. With the new system, Florentine traders and writers developed double-entry bookkeeping and worked out seven operations: Numeration, Addition, Subtraction, Multiplication, Division, Involution, and Evolution, while Italian and English arithmeticians simplified the processes. The Arabs added from left to right. Garth, an Englishman, devised a plan to add from right to left. One has only to compare the solution of a problem in Division by Pacioli or Tartaglia with the work done even in the third grade of the schools to-day to note what simplification has taken place.

The invention of printing with movable types, together with the great commercial activity carried on through the Hanseatic League and other agencies gave a remarkable stimulus to algoristic Arithmetic in Europe. In the sixteenth century sweeping transitions occurred. The manuscript Arithmetics were replaced by printed books; Roman symbols yielded to the Hindu characters; the Arithmetic of the learned became the possession of the common people; and counters disappeared in favor of figures. Many authors were found in Italy, France, Germany, Holland, and England, and the art of reckoning with the pen rapidly replaced the art of calculating with the abacus. The Hanseatic League established *Rechenschulen* along its trade routes and these commercial schools had much to do in keeping Arithmetic out of the regular schools. The first German Arithmetic appeared in 1482 from the pen of Ulrich Wagner, a *Rechenmeister* of this League. Many topics, such as Partnership with Time, came into use then as a practical business subject, and have been retained in our modern text-books long after the business world has discarded the methods they present. It was through the influence of Pestalozzi that Arithmetic was given such a prominent place in the schools. Despite strenuous efforts to discredit its value and to minimize its standing among the branches of learning in recent years, it is still receiving from 12% to 26% of the entire time devoted to recitation in the Elementary Schools throughout the civilized countries of the world (90).

III. Psychology of Arithmetic

The big question among teachers is to know how to teach according to sound principles. As with other subjects in the curriculum, scientific methods in Arithmetic must ultimately be based upon genetic psychology. Until we approach from the lower side the many questions of material and method, there will be only an approximation to the real solution. Most methods have been superimposed, so to speak, upon the child from above and only in late years has there come any decided scientific tendency to study the genesis of number and the processes of computation from the child's point of view. These studies are yet confessedly few and do not warrant an attempt at a full statement of scientific method based upon them. What has been learned may assist in better pedagogical procedure and incite to further original research.

Genesis of Number Ideas.—Major (75, 167) observed his son among other things for the rise of his ideas of number. He found him able to miss one ball out of his wagon, when three were in it, at the age of 21 months. While the child had a confused idea of 3, 4, and 5, at three years of age, Major received, many times, the correct number, 1, or 2, or 3, when apples were used, by throwing them on the ground and asking for a certain number. Later, the child's interest declined. Preyer's boy missed one of his 10 toys (75, 166), at the age of only 18 months, and at 878 days of age counted his nine-pins by standing them in a row and saying: "Eins! Eins! Eins! Noch Eins! Noch Eins!" and so on to the end of the row. On her 584th day, Dearborn's little daughter

(32a, 176) counted 6 cattle in a picture by saying: "One, two; one, two; one, two." He thinks she knew the number 2 as early as the 543rd day, and also says the same thing about 1. Decroly thinks his little girl knew 2 before she recognized what 1 is (33a, 119). The 2 seemed to remain for some time as the only number the child grasped. Binet's daughter at 30 months of age comprehended 2, and could get the idea of 4 at 51 months (33a). Lindner's son at 23 months had the number 2 (33a). Moore's three children had the idea of 2 at 22, 26, and 29 months; and a good idea of 3 at 32, and 53 months. Scupin's child (33a) knew 2 at 22 months.

Clara and William Stern studied their children very carefully and report that they could use numbers correctly in connection with apples, for instance, long before the abstract idea of number arose, or even before number could be rightly applied to other objects of less interest (33a). Ordinals were learned before cardinals. Major reports ordinals and cardinals as confusing to his child (75, 173), while Hilde Stern could get the fifth finger, but did not seem to understand the sum of her fingers and thumb on one hand (74a). Decroly made many careful observations upon his daughter and contributes a very interesting opinion that she knew the number 2 long before she had the idea of 1. This does not seem to have been observed by others who have studied the genesis of number in infants and deserves to have more attention. While his child got the idea of *two* at 19 months of age, she was able to differentiate *three,* at 28 months, from *two* or *one.* In another month she picked out 2 objects by the aid of her fingers, and at 35 months did this without using the fingers. At 41 months, she seemed to have the idea of 3 quite well in mind and in another month the idea of 4 appeared to be somewhat clear. Still, as many other child-observers have found in their studies, there was a reversion of both interest and apparent ability later, and at 46 months of age the little girl had a confused idea of 3 and 4, calling them simply, "more." At 51 months, 3 arose again to clearness and soon was well comprehended. By her 57th month she was able to hand the correct number of objects, up to 5, indicated by having held up for her problem one or more fingers. This showed an ability to abstract the idea of number, say from four fingers held up by her father, and of applying the number thus gained to the apples or other objects asked for. Sully found his child at 4 years 3 months calling big beads "6," smaller ones, "5," and still smaller ones, "4." At 5 years old, however, he placed four crab-apples upon the sand, added two to them mentally, and beginning with calling the first one "3," counted them correctly up to 6. He could also count his four playthings, two dolls, a tin soldier, and a shell, from memory, after they had been put away. Sully says (121, 352) that the drawings of children 5 years of age show small regard for the five fingers of the hand. In the growth of infants in number ideas we find marked individual differences, and it can only be said yet that the idea of number seems to be forming intelligently about the fourth year (75, 165).

Lietzmann (72, 22) thinks schools often make a mistake in proceeding as if the child has no ideas of number when it enters school. "The beginnings of number lie much earlier. When the child comes to school, it will, in a majority of cases, already know the number words possibly up to 10, or 12." Of 1,217 children entering the *Volksschulen* in Breslau, 10% could count up to 5, 78% could count up to 10, 4% up to 100, and nearly 1% over 100.

Bailard says (9, 58): "It is a well known fact that children learn to count of their own accord. They do it at home, on the playground, and at their games. It is impossible to stop them." "I tested a school where no counting is especially taught and found that about 60% of the children could count up to 20, before they were 5 years old, and about 30% could count up to 30 before they were 6." Meumann (79, Bd. 2, 345) agrees with Preyer and the other few child psychologists that the child has a somewhat fully intelligible use of numbers from 1 to 10 at the earliest toward the close of the 4th year of its life. In his report of the Fielden School, Manchester, Eng., Harrison (54, 269) says the children play with dominoes and "the result is, that already the five-year olds are able to write correctly on the blackboard the result of 2 plus 7, 9 plus 5, etc." This agrees with Montessori who has children at three to begin counting with buttons, plates, or money, and later with sets of blocks.

There are two very distinct schools of educators on the question of the origin of the child's notion of number. One party maintains that ideas of number are developed through the simultaneous perception of several objects, or stimuli, presented to the senses. With Newcomb (87) they hold that "our teaching of numbers is too abstract,—too much dissociated from objects of sense." Many experiments have been performed in recent years to determine how many objects one may be able to apprehend accurately without counting. For this purpose the time exposure is made as brief as possible so as to prevent counting. Nanu (86) used bright dots on a dark background and gave a time exposure of 33/1000 of a second. She arranged the dots in different figures and found that 5 could be perceived in a line, 10 in a parallelogram, and 8 in a hexagon in 75% of the cases. Lay (67) performed many experiments and found a greater percentage of successes attended the arrangement of dots in quadrate form. He is a strong advocate of the objective method of teaching the early number work. He quotes the experiments of Goldscheider and Müller, von Scheele, Schneider, Külpe, Cattell, Dietze, Warren and Messenger in support of his claims. However, his contentions are not without vigorous criticism from Walsemann, Knilling, Knoche, and the whole school of Herbartians. McLellan and Dewey (76) would base the development of number upon measuring,—upon the ratio idea. They hold that there is no number without measurement (p. 242) nor measurement without the fraction implied. Tear reviewed the Speer arithmetic a half generation ago and quotes Newton (123, 631): "Number is the abstract ratio of one quantity to another quantity of the same kind." So, also, the great Swiss mathematician, Euler, is cited: "Number is the ratio of one quantity to another quantity taken as a unit."

In direct opposition to this notion of the origin of number in the child mind and to the consequent procedure in teaching, there is a strong party which maintains that the presentation of the objects in a series, or the stimuli in succession, is the proper method. Gilbert (43, 110) believes that counting is "the first step in systematic thinking," while Phillips decides (95, 227) that "the first step is surely the formation of the series-idea." He holds that counting is fundamental, and that children forbidden to count on their fingers sometimes count by using their toes, or move an elbow, or press a muscle, or clear the throat slightly in order to follow the series. Among his reasons for rejecting the Grube method, Badanes says (6, 34): "It is false from the point of view of Arithmetic as a science and as an art. It ignores the process of counting." The dispute really carries us back into the philosophical question as to whether number has time-relation only, or space-relation only, or neither, or both. It will suffice to present the writer's view on the pedagogical significance of the discussion to quote with approval the words of Meumann (79, 338): From the psychological point of view number-concepts seem to possess both temporal and spatial qualities, and either of the views alone represents necessarily a one-sided notion, that by the series-method and by the simultaneous-method the child gains something of power not contained in the other. "The fact that by both methods good results can be obtained shows that a complement of these methods, or the simultaneous employment of both, must be the right way of complete comprehension of number for the child."

On the side of anthropology, many systems of notation have been found among primitive peoples, and no definite correlation seems to exist between these systems and the civil development of the tribes. The highly civilized Peruvians knew almost no arithmetic as an art and nothing of it as a science, according to Conant (24, 150), while the Yorubas, a very barbarous tribe in Africa could count quite expertly. Many savage tribes count only up to two, and have number words only for "one," "two," and "many" or some other verbal device for distinguishing their first definite number ideas from the indefinite ones lying beyond. The lowest Brazilian tribes count to 3, and the Carribees, Galibi, Abipones and many others go up to 4. As a rule the South American and Australian tribes count seldom above 3 or 4. Among some of the Australians only binary systems prevail, while ternary and quaternary systems abound among the Indian tribes of South America. Yet, some Pacific island tribes have been found with ability to count up into millions in their trade in fish and breadfruit. Quinary scales are widely diffused throughout the world, and a few octonary systems are believed to have existed. Some scant traces of vigesimal systems have been found. All these facts show how slowly and imperfectly the concept of number has arisen among primitive peoples, who seem to have used numbers only as necessity forced the matter upon them. Need for counting in their barter with one another had more influence upon number than did their general intelligence, or any subjective interest in it. Conant (25, 31) says:

> "If the life of any tribe is such as to induce trade and barter with their neighbors, a considerable quickness in reckoning will be developed among them. Otherwise this power will remain dormant because there is but little in the life of primitive man to call for its exercise."

More recently Boas (10, 65-66) has stated this as follows:

> "The fact that generalized forms of expression are not used does not prove inability to form them, but merely proves that the mode of life of the people is such that they are not required; that they would, however, develop just as soon as needed. This point of view is also corroborated by a study of the numeral systems of primitive languages. As is well known, many languages exist in which the numerals do not exceed two or three. It has been inferred from this that the people speaking these languages are not capable of forming the concept of higher numbers. I think this interpretation of the existing conditions is highly erroneous. Peoples like the South American Indians (among whom these defective numeral systems are found), or like the Eskimo (whose old system of numbers probably did not exceed ten), are presumably not in need of

higher numerical expressions, because there are not many objects that they have to count. On the other hand, just as soon as these same people find themselves in contact with civilization, and when they acquire standards of value that have to be counted, they adopt with perfect ease higher numerals from other languages and develop a more or less perfect system of counting. . . . It must be borne in mind that counting does not become necessary until objects are considered in such generalized form that their individualities are entirely lost sight of. For this reason it is possible that even a person who has a flock of domesticated animals may know them by name and by their characteristics without ever desiring to count them. Members of a war expedition may be known by name and may not be counted. In short, there is no proof that the use of numerals is in any way connected with the inability to form concepts of higher numbers."

It may not be an unfair or unwarranted deduction from all these studies and views to believe that children at school entrance in America may have ample ability to delight in numbers although they may show little interest in them up to that time. The child-mind no doubt expands intelligently with its growth in experience with objects of multitude, much as the development of the primitive mind does, as described by Boas. Its early work with these numbers can be motivated and made attractive in a manner paralleling the race expansion. "The child is a natural symbolist," says Mary R. Alling-Aber (3, 171). "A corn-cob with a dress on it will do for a baby and a stick with no additions, for a horse. To let one thing stand for another is as easy to a child as to breathe." There is an easy transition from the objects, too, to numbers and then from numbers to symbols at an age corresponding to school entrance.

Time of Beginning Arithmetic.—With regard to the time when Arithmetic should be introduced into the schools and when it should be completed there is some difference of opinion, and the matter is just now in the polemical stage. One group of educators holds that it should not be taught, except incidentally, in the first grade, or first and second, or the first three grades. The majority report of the Committee of Fifteen of the National Educational Association, in 1895, urged the beginning of the subject in the second and its completion in the sixth grade. Burnham (17, 65) believes there is "ample reason for postponing the work of Arithmetic until the age of 10, or, more accurately, to that stage of development which is likely to be found in normal children at this age. While it is greatly to be desired that more investigations be made in regard to this subject, with our present experience this seems to be a wise rule." Chartres (22, 278) says that "separate Arithmetic classes should not be taught in the first grade; it is better to defer them to the second grade, and probably it would be better to begin Arithmetic in the fourth grade if our text-books were built with that in view." So also writes Stamper (113, 258): "The general tendency in this country is to refrain from all drill work in the first year. In fact, some schools defer such work until the middle of the second year, or the beginning of the third."

On the other side of the controversy are to be found many ardent protagonists. Smith (105, 128) says: "Not to put Arithmetic as a topic in the first grade is to make sure that it will not be seriously or systematically taught there in nine-tenths of the schools of the country. The average teacher, not in the cities merely, but throughout the country generally, will simply touch upon it in the most perfunctory way. Whatever of scientific statistics we have show that this is true, and that children so taught are not, when they enter the intermediate grades, as well prepared in Arithmetic as those who have studied the subject as a topic from the first grade on." In a very recent article (106, 95) he further argues: "All the talk about having no Arithmetic in grades 1 and 2, or leaving it to the whim of the teacher, has not shaken the belief of the great schools of the world in the wisdom of Pestalozzi's judgment." "Arithmetic is a game and all boys and girls are mere players. We have not learned this very thoroughly yet, but we are making progress." Montessori (83, 326) claims to achieve some wonderful results even with children of pre-school age. Greenwood (47) dissented from the report of the Committee of Fifteen and furnished a *verbatim* report of some actual teaching and results in the Kansas City Schools as proof of his contention that Arithmetic is eminently successful in the lower grades. "No greater difficulty to get small children to grasp the nature of a fraction as such than in getting them to grasp the simple whole numbers. . . . Children get the idea of half, third, quarter, long before they enter school." Hence, he advocates teaching them to add, subtract, multiply and divide fractions in the first grade. Cook (7) says: "I visited the Kansas City schools and testify that Mr. Greenwood has not overestimated conditions. I took some third-grade work home and tried it on Normal students, and they couldn't do it as rapidly as those children did it." In Germany a little more than 20% of the time in the first two grades is devoted to Arithmetic. In the United States, according to the report formulated in 1911 by the American Committee of the International Commission on the Teaching of Mathematics (56, 16-65, 75-78) cities reporting about one-tenth of the school population of the country show that Arithmetic is taught as a topic in the first grade in 71.5%; in the second grade it is introduced in 22%; and in the third grade in 6.5%. (See Table E for further details.) In country, or rural schools, it may be said to be taught in the first grade in practically all the schools.

The writer personally believes that there should be systematic teaching of numbers in the first grades. The child's natural interest in numbers and the rich opportunities for presenting numbers in concrete objects should be utilized. Mere rote work must be avoided, but these early years are of inestimable value in furnishing a substantial foundation in the child's individual growth in the comprehension of numbers. Counting may also be used in these grades to diversify the work and add to the useful results.

Utility and Discipline.—Another question of much interest and one upon which there is considerable controversy yet, is that of the so-called disciplinary value of Arithmetic. The matter is at least as old as Plato, who says in his Republic: "And you have further remarked that those who have a natural talent for calculation are generally quick at every other kind of knowledge, and even the dull, if they have arithmetical training, gain in quickness, if not in any other way." In mathematics, perhaps, more than in any other subject, the doctrine of formal discipline, or transfer of training, has been most successfully maintained. If Arithmetic has not been kept in the curriculum as a practical subject it has staid there as a disciplinarian of the intellect. John Stuart Mill attributed his success in speculation to his mathematical training,—"the habit of never accepting half solutions of difficulties as complete, never abandoning a puzzle, but again and again returning to it until it was cleared up; never allowing obscurities in a subject to remain unexplained because they did not seem important; never thinking I perfectly understood any part of a subject until I understood the whole." This is not the place to discuss the general question of mental discipline, or transfer of training, upon which an extensive and varied literature has been produced within the past decade. It is not well to accept either of the two extreme positions noted in the literature, but at present the value of arithmetic in the school course may be defended upon both practical and disciplinary grounds. In its utilitarian aspects the demands of every-day commercial life are sufficient proof. And on the subjective side, if it should be shown that one intellectual trait does not and cannot assist any other, still the *Einstellung* toward matters under consideration trained into children in Arithmetic may be advanced as evidence of the subjective discipline of Arithmetic.

The certainties found in Arithmetic, too, have a moral value to children as they approach so much of uncertainty in other studies.

IV. Experimental Studies

Many experimental studies of the teaching of Arithmetic and the various processes of learning the different operations in handling numbers have been made, notably within the past two years. While they have been concerned principally with only the fundamental operations, a synthetic study of their results should throw some added light upon our problem of finding a scientific basis for Arithmetical Methods. Thousands of children have been tested and drilled under more or less controlled conditions, and the results are now becoming available for comparative pedagogical purposes. Much yet remains to be learned by further experimentation, but a consideration of those studies that have been made and published will assist materially in determining more clearly than has been done heretofore the weakness of the present methods, their strong features, and suggest the next step in the search for a sound pedagogy of Arithmetic.

Influence of Puberty.—Voigt made some studies upon children from ten to fourteen years of age in the Volksschulen (80, 117). Instead of using the ordinary decimal system of notation, he employed systems in which 8 and 6 were the bases. By this means he reduced to a minimum the use of knowledge already possessed by the children. Among his results are these: 1, The learning of new systems does not progress gradually, but by "leaps;" 2, Between the ages of 13 and 14 the boys showed a marked increase in ability; 3, Between the ages of 12 and 13 the girls showed this rise in ability. It was noticed that the onset of puberty gave a decided increase in the ability to work independently in numbers. Prior to this time the children as a rule work mechanically, according to "copy." The boys reached the period of independent work from 1 to 1½ years in physiological age later than the girls; hence, the girls of the same age as the boys after the beginning of puberty are usually more than one year ahead of them in number work. That is, problems which boys can solve independently in their eighth year in school can be as easily solved by girls in their seventh year. Rice and Courtis both found the 6th grade especially troublesome, as there were disturbances in the scores of that grade in the many records which they gathered. In the recent tests in Boston (38, 23) this errancy was found in the 7th grade. Since Boston admits children at five years of age, the 7th grade there would correspond to the 6th grade in physiological age elsewhere. It appears from the tests of Voigt, Rice and Courtis that the dawn of adolescence, affecting as it does markedly the physiological nature of the child, has also a great effect upon its ability to do accurate and independent work with numbers. Before this time, mechanical work is done; after this period the rise of independence and self-reliance changes the emphasis to the reasoning phases of arithmetical solutions.

Value of Drill.—A number of experimental studies have been made to arrive at some fundamental facts concerning the value of drill. Brown (13, 81ff) gave the Stone tests to 6th, 7th, and 8th grades of the practice school of the Eastern Illinois State Normal School, consisting of 51 pupils, 18 boys and 33 girls. Two sections were made of them. One was drilled upon fundamentals for five minutes each day for thirty days, while the other pursued regular work. A test at the end showed that the drilled pupils made a much larger advancement than the others. His results also showed that the 6th grade children profited more from drill than did the next higher grades. Later, he carried his experiments into three school systems (13, 488), confining the tests to the 6th grade and to the four fundamental operations. In all, he tested 222 pupils, 110 boys and 112 girls. Only twenty days were allowed between the first and the second tests, during which time one group in each school was given five minutes extra drill in the fundamentals besides the regular work which the other section followed. The results showed a gain on the part of the non-drill group in problems solved of 6.4%; in Addition, of 6.8%; in Subtraction, of 11.9%; in Multiplication, of 10.9%; in Division, of 15.4%. The drill group gained on these same items respectively: 16.9%, 18.5%, 32%, 24.1%, and 34.2%. These are only the aggregates. Of the 112 cases of drilled pupils, 95 gained, 5 did not advance and 12 lost. Of the 110 cases of non-drilled pupils, 50 gained, 7 had the same score as at the beginning, and 53 lost. In the individual studies and aggregates submitted it appears that the drilled groups gained from two to three times as much as the non-drilled groups. "All teachers of the drill classes reported an improvement also in the text-book work." The drill excited them to keener interest in the regular lessons (13, 489).

In March, 1912, Phillips (93) gave the Stone tests to 33 boys and 36 girls of the 6th, 7th, and 8th grades. Each grade was divided into two groups, one pursuing regular work and the other receiving in addition a ten-minute drill daily upon fundamental operations and upon reasoning upon mental problems. At the end of two months the two groups were again submitted to the Stone test with the following results: 6th grade non-drill, gain in Fundamentals, 55%; drill group, 45%; 7th grade, in Fundamentals, non-drill, 10%; drill group, 22%; 8th grade, in Fundamentals, non-drill, 16%; drill, 25%; all grades, gain in Fundamentals, non-drill, 27%; drill, 31%. In Reasoning: the 6th grade gain was: non-drill, 36%; drill, 55%; 7th grade, non-drill, 17%; drill, 29%; 8th grade, non-drill, 12%; drill, 15%; all, non-drill, 22%; drill, 33%.

Starch (114) gave 15 observers eight preliminary tests, six in arithmetical operations and two in auditory memory span for numbers. Of these observers, 8 were then given fourteen days' practice in mental multiplication of 50 problems each day, totaling 700 problems. The other 7 observers were given no practice. On the second test the practiced observers showed from twenty to forty per cent improvement more than the others in the arithmetical operations, while there was little change in the memory span in either group. Thorndike (125) experimented with 33 adults to learn the increase in efficiency in mental multiplication, judged by the reduction in the time required. He used no figure below 3 and none was repeated. All his subjects showed improvement through drill, and he says:

> "The fact that these mature and competent minds improved in the course of so short a training so much as to be able to do an equal task in two-fifths of the time first taken is worthy of attention." "The most ardent advocate of the general influence of specific practice would not, I judge, claim that ten hours drill in any one thing could improve an already well-educated adult 50%, or 5%, or even 1% in the average of all his intellectual processes."

He found a rapid rise in the rate of improvement during the early practice, an observation generally confirmed by all experimenters. At another time he used 19 adult subjects, 8 men and 11 women students in Columbia University, giving them each day for seven days 48 columns of ten figures each to add, in all 2,592 additions. These subjects were able on the second test to reduce the time 31% and the errors 29%, with a total improvement of 29%. Only fifty-three minutes' practice was actually given. Thorndike says of this test:

> "That the practice represented by only 2,592 additions made by an educated adult whose addition associations have been long established and often used should produce an improvement of three-tenths bears witness to the continued plasticity and educability of the synapses involved."

In another connection he has stated (127, 290):

> "So apparently simple an ability as ordinary addition of integers can be shown to require analysis into at least nine separate abilities, each of which probably requires further analysis, in one case, into perhaps ninety component ability-atoms."

Similarly, Donovan and Thorndike (128, 134) used 29 fourth-grade pupils and found in a practice series, given two periods of two minutes each per day for three school weeks, or a total of thirty two-minute periods, the average rose from 2¾ to 4½ examples per minute. Kirby (65, 24) studied experimentally 732 children in the fourth grade, testing them before and after sixty minutes of practice, after the method just mentioned. He found the average score changed from 31 columns with 24 correct per minute to 50 columns with 37 correct. The children, therefore, gained 61% in attempts and 54% in correct additions, and maintained the same rate in their accuracy and in their speed, almost. Hahn (128, 134) has obtained similar results. Kirby also gave a series of drills for fifty minutes to 606 third and fourth grade children. At the beginning the children averaged 40 simple divisions per minute, with 37 correct, an accuracy of almost 93%. At the close of the drill series they performed 73 divisions per minute with 70 correct, an accuracy of almost 97%. They had gained 83% in speed and almost 90% in their accurate results. At McLean Hospital, Wells found that ten nurses, five men and five women, in oral addition of digits printed one above the other, in five weeks, practicing five minutes per day, six days in the week,—a total of 150 minutes of practice, increased their speed nearly 100% and maintained about the same rate of gain in accurate work. The five women on the first day performed 1,115 additions in five minutes, while the five men reached 1,120. On the thirtieth day the women aggregated 2,210, and the men 2,178 additions. The lowest score at first was made by a woman who got 150, and at the end she reached 280. The highest at first was by a man who got 290 and on the thirtieth day he went to 540. It is observed that the lowest and the highest made practically the same rate of gain. Whitley (134, 129) tested nine subjects in mental multiplication, giving a practice series of three examples per day for twenty days, omitting Sundays. These subjects averaged 2.8 minutes practice per day, or a total of fifty-six minutes. The results show more than 100% gain in speed, with no ill effect upon accuracy.

In the Dumfries schools, Jeffrey (61, 392) selected 9 boys and 9 girls, and placed them in three groups according to their mental ability, as disclosed in previous school work.

Each group consisted of three boys and three girls, the groups being classified as bright, average and dull. They were all given fifteen-minute drills for five consecutive days and then were tested with the following results: The 9 boys made 19,717 additions and the 9 girls made 18,304, with 126 errors by the boys and 134 errors by the girls. The group results were: bright boys gained from first to second day, 49.1%, girls, 32.7%; average boys, 28.2%, girls, 32.3%; dull boys, 25.7%; girls, 44.6%. From first to fifth day the gains were: bright boys, 90.9%, girls, 58.9%; average boys, 62.9%, girls, 67.2%; dull boys, 47.4%, girls, 91.1%.

Short and Long Periods of Drill.—Kirby tried the effect of dividing the total practice time into periods of different lengths. He used 1,338 children (65, 63) and his results have considerable pedagogic value. Using 100 as a standard of comparison his data may be expressed as follows: Gains made with 22-minute practice periods, 100; 15-minute periods, 121; 6-minute periods, 101; 2-minute periods, 146.5. These were in addition. The results in division were: from 20-minute periods taken as a basis, 100; 10-minute periods, 110.5; 2-minute periods, 177. That is, the short periods of practice scattered over more days give a higher rate of gain. These are subject, however, to discount since the children during the longer time elapsing from the first to the last test would gain more from their regular work than those taking the longer single periods of practice. In the Whitley tests already referred to it should be noted that after twenty days, with practice upon only three examples each day, the subjects were able to reduce the time from 338 seconds, with 1.7 errors per example to 135 seconds with 1.4 errors per example. Thorndike drilled sixteen subjects continuously on sixty examples, the number used by Whitley, but employing only one period of practice, varying from 2 to 12 hours. His adult subjects took an average of 352 seconds per example with 1.2 errors on the first test, and 160 seconds with 0.8 errors on their final test. Their total time of practice averaged higher than did those tested by Whitley, while their gain was not so marked. However, it is to be noted that Thorndike's subjects took their final test at the close of three or four hours of unrelenting practice, and some allowance is to be made for their jaded condition.

Permanency of Improvement through Drill.—Wells tested for the permanence of improvement in the adult nurses who had taken the drill from January to April, 1910, giving six of them two tests in December, 1912, after a lapse of 2 years and 8 months (128, 323). In January, 1910, they had averaged 234 additions in their first test and 274 on the second, while their average score in the final test in April, 1910, had been 447. In December, 1912, these same adults on their first test scored 343 additions and the next day raised it to 375. Kirby (65, 71ff) tested 258 of his fourth-grade children from three to twelve weeks after they had relinquished their practice and found them able to do as well as they had done on their previous final tests. He again submitted 152 of them to tests in September, at the opening of school after the summer vacation, and they showed a decided loss in speed with some decrease in accuracy. Prac-

TABLE A

Twenty Leading "Type-Errors," Made by Two Hundred and Thirty-eight Children in Addition of Digits, Arranged in Order of Frequency. Compiled from Phelps (92)

Rank	Combination	Total number of errors	Percentage of the attempts	Number of children making the error	Percentage of the children making the error	Number of children making the error more than once	Percentage of children making the error two or more times
1	9 plus 7	395	3.32	120	50.42	63	26.47
2	8 plus 5	369	3.10	109	45.80	59	24.79
3	9 plus 6	320	2.69	94	39.49	49	20.59
4	9 plus 3	304	2.55	91	38.23	47	19.75
5	9 plus 5	298	2.50	86	36.13	38	15.96
6	9 plus 8	145	2.44	79	33.19	37	15.55
7	8 plus 4	142	2.38	79	33.19	33	13.86
8	8 plus 7	137	2.30	74	31.09	32	13.44
9	6 plus 5	135	2.27	72	30.25	31	13.02
10	7 plus 5	134	2.25	71	29.83	31	13.02
11	7 plus 3	120	2.02	67	28.15	26	10.92
12	8 plus 8	118	1.98	67	28.15	25	10.50
13	7 plus 4	232	1.95	60	25.21	25	10.50
14	8 plus 3	231	1.94	59	24.79	24	10.08
15	7 plus 6	186	1.56	58	24.37	23	9.66
16	3 plus 3	87	1.46	52	21.85	21	8.82
17	7 plus 2	158	1.33	52	21.85	21	8.82
18	5 plus 3	78	1.31	48	20.17	20	8.40
19	6 plus 3	71	1.19	48	20.17	17	7.14
20	9 plus 2	71	1.19	44	18.48	15	6.30

tice drills of fifteen to forty-five minutes were sufficient to restore the speed of the former tests. Brown (13) tested his practice school class, already discussed, after the summer vacation of twelve weeks and found that the drilled section in September was able to raise the averages made in June, while the undrilled section either showed no gain or had retrograded.

Type-Errors.—Phelps (92) reviews the Otis-Davidson tests upon 270 children in the eighth grade and uses their data in the study of errors. These tests were given in the grammar school at San Jose, Cal., and 238 sets of papers, 5,950 separate tests, were obtained. In Table A I have arranged the chief mistakes in addition in the order of their frequency.

There is a remarkably consistent showing in the table,—the combinations, which were the more difficult as shown by the number of times they occur, are also those which are made by the largest number of children and are more often repeated by the same child than the other combinations. Of the eight schools reported, those showing the highest speed had the lowest percentage of accuracy.

Phillips (95, 245), out of 440 returns made to him, gives the following list of difficult combinations of the digits in addition: 157 find 9 plus 7 the hardest; 88, 7 plus 8; 34, 6 plus 7; 42 find 7 alone troublesome; 18, 9 only; 26 are bothered in using 3, 6, and 8; 327 mention 7, and 204 give 9 in the list of digits they find hard to handle correctly.

In 1905 in Budapest, Ranschburg (97) tested 153 children, to whom he gave 65 tests, 20 each in Addition and Subtraction, 15 in Multiplication, and 10 in Division, in an attempt to determine which fundamental operation is the most difficult to school children. If we consider accuracy alone, his order, placing the easiest first, is: Addition, Multiplication, Subtraction and Division; but if they are arranged according to speed they are: Multiplication, Addition, Division and Subtraction. If both speed and accuracy be combined the order is: Multiplication, 68.75%; Addition, 60.25%; Division, 50.65%; and Subtraction, 46.82%.

Manner of Adding.—Arnett (5, 327ff) tested eight adults in their habits of adding, using 15 columns of 27 figures each. He had them add for thirty minutes, rest a few minutes and then add for thirty minutes more. Nearly 200 columns were added. It was found that some of the subjects employed straight addition, following the columns and making as many additions as there were intervals between figures, while others used combinations of digits. Out of a possible use of 840 combinations one announced 840 results, while another gave only 519 results for a possible 810, having made 171 combinations of two figures and 43 combinations of three figures each.

Cole gave three tests to 35 persons selected at random to determine their habits of adding upward and downward. The first test consisted of 20 columns of 40 figures each, the subjects adding the odd columns upward and the even ones downward. The downward adding required 15.3% more time than the upward adding, but there were fewer errors in it,—54% of the errors being made in the upward and 46% in the downward adding. The second test consisted of 10 columns, identical for the upward and the downward adding, and a third tested the reading of numbers from left to right and from right to left in a horizontal line. It was found that the established habit of adding upward gave more speed but resulted in greater liability to error. In the reading of numbers the average time from left to right was 34.4 seconds with 62 errors, while the reading to the left averaged 37.1 seconds with a total of 36 errors. The usual reading habit afforded greater speed to the right, but the additional attention that was demanded in the reversed reading resulted in a higher accuracy (23, 83ff).

Socialization of Arithmetic.—Paine reports a recent experiment in Boston with some sixth-grade children who were slow and indolent in Arithmetic, but not mentally defective. They were chronic "failers" and were particularly deficient in Arithmetic. A "grocery store" was fitted out for them with enough of the real supplies to make the experiment more than symbolic. It was found that the children took on new life not only in Arithmetic but in their Language work as well. The results in Arithmetic are given as follows:

1. Increased accuracy and speed in computations.
2. Confidence was established in independent solution of problems.
3. A good drill was afforded in making up original problems.
4.Some valuable training was gained in business methods.

Dooley (37) also reports some interesting work in the successful motivation of Arithmetic in the Massachusetts Industrial School.

The Wording of Problems.—The effect upon results occasioned by a change in the wording of problems is reported by Phillips (95, 268) in the case of 224 teachers or those preparing to teach. When 40 problems involving Gain or

Loss, expressed in common fractions, was given them 81.6% of them solved all correctly while the others averaged 5 problems missed. Later the same problems were given to 212 of the same group, with a change only in the wording from fractions to per cent and 62% solved all correctly, while the others averaged 3 missed. During the past year Courtis (31, 4) turned his attention to the question of the wording of problems. He was able to construct twenty-one varieties of problems, based upon a single situation, by changing the form of the question and the relative position of the phrases employed, and his tests showed that one of these problems, measured by the errors made by children in solving them, was nineteen times as difficult as another. That the mere rearrangement of the words and phrases in problems causes such wide difference in results should have careful consideration from both authors of Arithmetics and teachers of that subject.

Correlation of Abilities in Arithmetic.—Lobsien (73) concludes upon some experimental studies of arithmetical abilities with the following:

1. There is no correlation between ability to remember number images visually and the ability to write numbers.
2. The greater the ability for solving problems in the head, the weaker is the memory of numbers gained through the eye.
3. The highest correlation exists between acoustic number-memory and ability to write numbers.
4. The good head-reckoner generally performs written work well, and *vice versa.*
5. Acoustic memory of numbers and ability to perform operations well have a smaller correlation.

Stone (117, 43) believes that ability in any fundamental, with the exception of Addition, implies ability in an equal degree in the other fundamentals, nearly, and he found that many factors influence individual abilities. In the extensive tests in the New York City schools, Courtis reports (30, 79) that speed and accuracy have no correlation and (p. 84) "it was found that a child with good reasoning ability did not make mistakes in the abstract work." So far as his analysis of the results goes, accuracy is dependent upon reasoning and simple reasoning is directly related to ability in abstract work, high scores in "test 6" (a simple reasoning test) being associated with high scores in "test 7" (a test in the fundamentals).

Up to a certain critical point there appears to be a definite correlation between a good knowledge of the tables and ability to work speedily in the abstract examples, and a lower correlation with accuracy. The curves given by Courtis for the 13,629 boys and the 13,542 girls agree quite closely. The evidence which he submits warrants the deduction that, in general, a knowledge of the tables makes for speed and accuracy up to a certain point, beyond which other factors play such an important part that further knowledge is of no benefit (92-96).

Winch (137) tested four schools in 1909 and one in 1910 in London, and reports his findings on this question, as the writer has gathered them together, as follows:

TABLE B

CORRELATION TESTS IN LONDON SCHOOLS

Tests	Grade	Number of pupils	Average age	Correlation between accuracy and reasoning	Effect of practice
1	7 and 8	32 girls	13	.68	Improvement. No "transfer" was observed
2	3	43 girls	10	.79	Accuracy gained
3	4	38 girls	10.5	.69	21% gain in accuracy
4	4	35 boys	10	.85	20% gain in accuracy
5	4	72 boys	10.25	.736	40% gain in accuracy

From his series of tests it appears that he found accuracy in computation to accompany good reasoning ability, but improvement in computation did not affect perceptibly accuracy in reasoning. Starch (114, 310) gave special attention to the question of transfer of training in his investigations, and concludes:

> "The improvement in the end was due to the identical elements acquired in the training series and directly utilized in the other arithmetical operations."

Comparison of Adults and Children.—Freeman (40a) sought in some experiments with 14 adults and 14 children, ranging in age between 6 and 14 years, to determine, if possible, how children differ from adults in the elementary scope of attention, and also what differences there are in the number of objects which may be grasped in a single act of attention by adults and children. He used spots of light thrown upon a screen as stimuli, and varied the time exposure from .018 to .040 of a second for the adults to more than a second for some of the children. He found the range of attention of adults and children to be nearer together than is generally supposed (p. 309). In adults he thinks the range may average 6, although his observers varied from 4 to 7, while children between 12 and 14 years of age will average 5 and younger children, 4 (p. 309). He gave 1,806 exposures to his adults, while Nanu gave only 100, and he also figured out very carefully the optimum distance at which to place his observers from the screen. For these reasons he thinks his results are better. Nanu found with her observers a decided tendency to underestimate the number of spots shown; only 1 of her 5 observers overestimated the number, while 11 of the 14 sitting for Freeman overestimated them. He reports one pure analytic type, four mixed types with strong analytic inclination, two mixed with inclination to the synthetic type, and seven of the pure mixed variety. He differs strikingly from the findings of Nanu, who reported that she found the synthetic thinkers always inclined to underestimate the numbers and the analytic type to overestimate them. Of Freeman's observers, the three who underestimated the numbers showed no tendency toward synthetic thinking, and the two who were at all inclined to synthesis overestimated the spots, —one in 94% of the erroneous judgments, and the other in 86% of the cases,—while four of the five who gave evidence of analytic thought underestimated them.

Some of the introspections seemed to show that the observers could image the groups of objects and describe them without having a grasp of the correct number, and he concludes that the number name is not essential to a comprehension of a group of objects. "Neither the word nor the name is necessary for the number-concept."

In his experiments with children he found less satisfactory results, as they were unable to give reliable introspections and only a small number of children of any age was used. Of the 14, two were 6 years of age; two were 7; two were 8; two were 10; four, 12; one, 13; and one, 14. As these were scattered through six of the eight grades, with no representative in the fourth and sixth grades, it gives small results for each grade. These children had been taught numbers upon the Russian reckoning-machine, so they were not entirely in new experiences. He found it necessary to exclude from his final results the four younger children's reactions, as they were unreliable. Of the remaining 10, he made two groups of 5 each according to ages. The 5 children between 8 and 10 years of age showed marked differences from the 5 who were 12 to 14 years old, while the older group resembled very much the adults, both in range of attention and in its behavior.

As a general result of his experiments Freeman concludes that:

(1) Children as a rule comprehend a number of objects less correctly than adults.
(2) Children prefer a horizontal arrangement of objects to be seen.
(3) Children show a more rapid decline in correct answers as the number of objects is increased.
(4) The range of attention in children is from 1 to 2 less than in adults.
(5) Children underestimate more frequently than adults.
(6) Definite arrangements in groups is less favorable for children than for adults.
(7) Attention in young children is very irregular.
(8) No correlation was found between school-talents and correct answers.
(9) Groups of 5 were better for the children and groups of 4 for adults. This last finding agrees with the contention of Lay that the quadrate form is the best; but Freeman finds it only true for adults, rather than for school-children.

It must be confessed that we do not yet have adequate results to justify any conclusions upon the perception of simultaneously presented objects as a basis for early number training. Too few observers have been used so far.

From such experiments as those of Freeman, one may be led to infer that the basis for the difficulties encountered by children and adults in mastering the multiplication table lies in the inability to handle numbers in groups of more than 5 or 6 readily. To master the table of 7's or 8's or 9's, one has to group the numbers in bundles of 7, or 8 or 9. The pupil usually finds the numbers below 6 rather easy in comparison with numbers between 6 and 10. To say the 9's, one has to group the numbers up to 90 in bunches of 9's, and the attention has to pass rapidly over the groups if the learner is at all visually minded.

Individual Differences.—There is to be seen from the various experiments reported a very wide divergence in number ability among school children. These differences are shown in the aversion of some to the subject as a school topic, while others choose it as their favorite branch. This is often caused by wrong motivation at some previous time, or to attitudes of parents toward the subject, or to poor teaching in a lower grade, in the case of those who dislike it; and to home encouragement, proper motivation, or good teaching, or perhaps, to all these influences combined in the case of those who prefer it. Frequently, it has been found that differences in habits of thinking cause variations in school interest in Arithmetic. No doubt, the varying degrees of interest may sometimes lie far back of school experience, in the child's opportunities to satisfy his inclinations for number in the nursery. Provisions that are made for the natural growth in number in young children in various materials afforded in the home, coupled with an active interest on the part of the mother, often determines the future bent of the child. While no other subject has been as much taught in the modern school, it is equally true that in no other subject has there been so much bad teaching. So to-day, partly through imperfect teaching and a variety of pre-school inclinations, we find in the school grades children of almost every degree of advancement in the same grade. Some in the first or second grades have as good ability in numbers as others in the sixth, seventh, or eighth grades.

Sex Differences.—In addition to the effect of puberty already cited from Voigt, a number of observations have been recorded upon the differences in arithmetical abilities dependent upon sex. Ballard (9, 18) says that in a series of tests in the London schools the girls showed better mechanical skill in the solutions, but the boys did the problems better, and " on the whole the boys were considerably ahead of the girls." Phillips (93, 163) tested 69 pupils in the Granite Falls, Minn., schools from March to May, 1912, and found in the progress made in drill work that " the girls did better than the boys in tests in fundamentals " and the boys " did better work in reasoning," while the boys made a greater gain between the tests than did the girls, their gain being about 24% over that of the girls. In his extensive tests in New York City, Courtis (30, 136) found also that " the girls exceeded the boys in the speed tests in multiplication, but they fell below them in accuracy in reasoning." From a comparison of all the scores made by the boys and the girls it is seen that the girls excel the boys in mechanical work in the fundamentals and the boys excel in simple reasoning. He concludes: " Differences between the abilities there undoubtedly are, but whether due to sex or to environmental influences the differences are too slight to be of any significance so far as present knowledge goes." Smith (109) reports on 3,869 students tested in the Normal School at Cortlandt, N. Y., as follows:

Of 1,265 men put on examination, 58.7% passed with an average of 84.1%.

Of 2,603 women put on examination, 50.6% passed with an average of 83.4%.
He also gives the records of 1,462 men and 1,564 women at Ypsilanti, Mich., which show practically no distinctions are to be made in Arithmetic on account of sex.

The Rice Tests.—In the autumn of 1902, Dr. J. M. Rice gave a test of eight problems to 6,000 school children in seven cities (98, 100). The children were chosen from grades four to eight inclusive. In all, 18 schools, some in the slum districts, some in the better districts and some in aristocratic neighborhoods, were included. He studied the effect of home environment, size of classes, total time per day given to Arithmetic, average age of pupils, forenoon and afternoon periods of recitation, methods of instruction, teaching ability of the instructors, and concluded that none of these was the determining factor in securing good results in the subject. Rather surprisingly he puts the whole responsibility ultimately upon the supervision. "This means (p. 136) in other words that the controlling factor in the accomplishment of results is to be found in the systems of examinations employed, some systems leading to better results than others." He found wide variations in the upper grades, mechanical errors increasing in them, with a decided deterioration in the 5th and 6th grades. Cities usually ranked with their individual schools; that is, good work in one school usually signified good work throughout the whole city.

The Stone Tests.—Dr. C. W. Stone (117) gives detailed data from 26 school systems scattered well over the United States and comprising tests in Arithmetic which he personally gave to 152 classes of pupils in the 6A grade. Of the systems tested, 6 were located in New England, 11 in the Middle East, and 9 in the Middle West. The tests were given under controlled conditions, and covered the fundamental operations and the children's ability to reason upon the solutions. With 6,000 sets of papers to study he draws the following conclusions:

1. The net result of arithmetic work in the first six years is *several products,* rather than *a* product. The study called Arithmetic makes demand upon a plurality of abilities (p. 43).
2. There is a great variability in the products of different systems, and greater still among individuals in any system. The variability among boys does not appreciably differ from that among girls.

3. The possession of a certain amount of ability by a system is a better guarantee of the same amount of another ability than the possession of a certain amount of ability by an individual is that he will have the same amount of another ability.

He agrees with Rice upon the effect of good supervision, but found different results on the tests in reasoning (p. 45). He had the courses in Arithmetic in these 26 systems rated for him by 21 professors and graduate students in education (p. 71) and compares the results of his tests with these ratings. He says:

> "The situation seems to be that the course of study is not at present the factor that it ought to be in producing abilities. In certain systems it is evidently working well, but in others there is a wide-spread disparagement between excellence in abilities and excellence in the course of study." "The course of study may be the most important single factor but it does not produce abilities unless taught. The other essential features for successful teaching are teachers and children of usual abilities, a reasonable time allotment, intelligent supervision and adequate measurement of results by tests (p. 91).

The Courtis Standard Tests.—Following immediately upon the results obtained by Stone, Dr. S. A. Courtis began by giving the Stone tests to 317 girls in the Liggett school at Detroit, in 1908 and 1909. These girls were scattered through the grades from the 3rd to the 13th. Using his results as a basis, in September, 1909, he devised a new set of tests covering speed in each of the four fundamental operations, one in copying figures, two in reasoning and one general test in all four fundamentals. Under controlled conditions these were given to the same school in September, 1909, and in June, 1910. Among other results he found as did Rice that the 6th grade was a "notoriously difficult" one, although it had ranked high as a 5th grade the previous year (29, p. 361).

From this beginning, Courtis came to believe that a uniform standard test could be devised, so he sought during the school year, 1910-11, to establish such a standard. He gathered papers from near 9,000 children in from 60 to 70 schools scattered in 10 states. These children had been given his 8 tests and a "standard" table was constructed from the results, which is given here after corrections have been made in it from later facts gathered altogether from 66,837 children and revised to August, 1913.

From Table C it will be seen that a 6th grade child should be able to give correctly 50 combinations in addition of digits, 38 in subtraction, 37 in multiplication and division, and copy figures at the rate of 92 per minute. The scores from grades 3 to 8 inclusive are revised to suit the figures from 66,837 tests, while the others, I understand, are those made out from the first studies gathered from 19 cities.

TABLE C

COURTIS STANDARD SCORES, SHOWING WHAT A CHILD IN EACH GRADE SHOULD BE ABLE TO ACCOMPLISH IN ONE MINUTE

Grade	Number of simple additions	Number of simple subtractions	Number of simple multiplications	Number of simple divisions	Number of figures copied
1	(6)	(6)	....	.....	(29)
2	(21)	(12)	(10)	(12)	(51)
3	26	19	16	16	63
4	34	25	23	23	75
5	42	31	30	30	84
6	50	38	37	37	92
7	58	44	41	44	100
8	63	49	45	49	108
9	(65)	(50)	(50)	(50)	(120)
10	(57)	(45)	(43)	(46)	(112)
11	(59)	(47)	(44)	(48)	(114)
12	(61)	(48)	(44)	(49)	(112)
13	(71)	(56)	(50)	(56)	(116)
14	(74)	(51)	(58)	(59)	(124)

The New York City Tests.—From March 15 to April 26, 1912, Courtis applied his tests in New York City to a list of 33,350 pupils, representing a school register of 40,000 pupils, or about one-tenth of the city school population from the 4th up to the 8th grade. Representative schools were selected in various parts of the city; 21 schools furnishing 380 classes with 12,147 pupils, were in Manhattan borough; 9 schools, with 148 classes and 4,488 pupils, were in the Bronx; 18 schools, with 315 classes and 10,243 pupils, were in Brooklyn; 2 schools with 23 classes and 646 pupils were in Richmond borough; and 2 schools with 37 classes and 1,145 pupils in Queens. From these, 28,669 complete returns were received, but only 27,171 were tabulated because of apparent irregularities in the remainder. Courtis went to New York and personally took charge of the tests at the request of the "Hanus Committee in Charge of Educational

Aspects of School Inquiry." His purpose was to determine, if possible, the following:

1. The standard of achievement in fundamental operations with whole numbers, and in simple reasoning.
2. The relative achievement of the schools tested, as measured by standards.
3. The relative achievement of grades and individuals, as measured by standards, so far as is necessary to indicate to teachers, principals, and superintendents how such knowledge could be used to make their work more efficient.
4. The relative achievement of New York City schools as a whole, as measured by standards derived from tests in other cities.

In the following table will be given the score of the various grades in each one of the eight tests used and at the same time the highest score made by any pupil, with some other data that may assist in one's understanding the gross results of the experimental study. It is not possible for us to enter upon any comprehensive consideration of the minor details reported by Courtis in his 158-page booklet. A few findings have already been mentioned and a few others remain to be noted after the table is studied.

TABLE D

CORRECT SCORE AVERAGES MADE BY THE DIFFERENT GRADES IN THE NEW YORK CITY SCHOOLS

Grades tested			4th	5th	6th	7th	8th	9th	10th	11th	12th
Number of pupils in each			5396	5386	5670	4771	4502	440	257	179	120
Average age of the pupils			10.5	11.3	12.4	13.9	14.6				
No.	Kind of test	Max. Score									
1	Addition,—speed	125	41.9	50.2	56.9	62.2	69.5	71.6	71.7	73.9	74.2
2	Subtraction,—speed	125	29.5	36.8	41	45.8	52.2	52.2	55.3	55.2	54.1
3	Multiplication,—speed	125	28.7	35	38.3	40.9	45.8	46.5	46.8	48.6	46.6
4	Division,—speed	125	26.6	34.7	39.7	44.6	50.9	52.5	52.7	54.2	55
5	Copying figures,—speed	205	75.4	85.5	92.5	100	106.8	98.8	104.5	109.4	105.6
6	Reasoning,—one step	16	1.8	2.3	3	3.7	4.4	5.1	5.1	5.1	5.7
7	Fundamentals	19	4.2	5.8	7	8.5	10.1	10.9	11.5	10.5	11
8	Reasoning,—two steps	8	.7	.9	1.3	1.7	2.1	2.5	2.6	2.7	2.7

It must be borne in mind that the Courtis tests are exactly the same for all the grades and that he holds that a score of forty answers per minute means double the ability that gives only twenty per minute (p. 17), and to change from 20 to 25 answers corresponds to a change from 40 to 45 per minute. The errors that were shown in the papers he classifies as follows:

1. Carelessness in bringing down the wrong figure in division or placing partial products in multiplication under the wrong figure, 12.5%.
2. Copying incorrectly, reversing figures, as 639 for 693, 8%.
3. In fundamental combinations, 50%.
4. Scattered, such as errors in carrying, etc., all the rest.

Many errors were found in handling zero. It is worthy of mention here that in Columbia University, in the summer of 1910, 41 adult graduate students, teachers and superintendents were tested and 18 made 104 mistakes in zero combinations particularly when zero occurred in the multiplier.

He found in the New York schools, as has been found wherever tests have been applied, that the work in fundamentals is very low both in speed and in accuracy in computation and simple reasoning. The critical period for the mastery of these fundamentals seems to lie down in the lower grades. In the introduction to the Courtis Report, Dr. Hanus calls attention to the low degree of efficiency in the schools and says: "Children of every level of ability are found in every grade and differences between individuals greatly exceed the difference between grades." For this reason the fundamentals should be adapted to the individuals and they should be taught in the light of individual capabilities. "This condition is universal and is not due to lack of effort or other conditions that could be easily removed, but to a neglect of one basic factor,—the difference in the powers and capabilities of children," (p. 76), because children are already at school entrance highly specialized in their mental habits. Courtis thinks (p. 130) that a more simple and practical course in Arithmetic, based directly upon the social needs of the children, would influence for good a greater number of both children and teachers.

The Boston Tests.—The same eight tests were given by Courtis to 29 of the schools in Boston, in October, 1912, and again in March, 1913. More than 500 classes and about 25,000 children were included. These tests were designed to determine the following facts:

1. The standard of arithmetical work in the Boston schools, and their comparative standing with other schools already tested.
2. The nature and degree of change produced by six months regular work in Arithmetic.
3. The effect of certain special methods of individual instruction.

Supt. Dyer devotes only thirteen pages of his recent report (38) to these tests, yet some valuable facts are disclosed:

1. Boston is lower in abstract work and higher in reasoning than New York.
2. A comparison of the tests in March with those six months earlier shows that 53% of the pupils made improvement, 30% stood still and 17% lost.
3. Four special methods were employed in the experimental study:
   - (a) In one group, each teacher took one period per week to work with individual pupils who seemed from the October tests to need particular strengthening upon certain points. This was continued for twelve weeks, and the group as a whole gained 14%.
   - (b) A second group had the assistance of an able specialist, one to each school being assigned to the task of giving individual help to children sent by the regular teachers. This also ran for twelve weeks, and 2,187 children out of 3,443 received individual assistance, in 60,000 interviews lasting 15 minutes each. The report says this method did not yield the results expected.
   - (c) A third group pursued regular work with no remedial help, and were used as a "control" group in measuring the others.
   - (d) A fourth group was formed in March, of pupils who had not taken the October tests, and they were given special daily drills on the fundamentals for ten minutes each day during the regular recitation period. In the March tests this group attempted fewer problems and examples than the others and "this method was the least effective."

A comparison of the three drilled groups with the "control" group shows that:

1. Group one, in which the regular teachers devoted one period per week to a class drill upon fundamentals, exceeded the "control" group by 8% in accuracy.

2. Group two, in which a special teacher gave individual help, exceeded it by 5%.
3. Group four, in which the ten-minute drill upon fundamentals preceded the test, exceeded it by only 3%.

These facts seem to emphasize the value of systematic work under the regular teacher and to discount the common practice of "cramming" for tests and examinations.

Personal Observation of the Recent Boston Tests.—On Thursday, January 8, 1914, the writer went to Boston to observe the giving of the new Courtis tests which were to be given to more than 20,000 children, beginning that day under the supervision of Miss Rose A. Carrigan, of the Boston Normal School. Three schools were selected, one mixed and one each in which the boys and girls are taught separately. Miss Carrigan had furnished me a list of all the schools to be tested each day, so I went on Thursday without her knowledge to schools of my own selection. In all, I saw the tests given to 8 rooms, 5th, 6th, and 7th grades, 350 children being present and taking the tests. I saw 15 of the young lady "cadets" doing the testing at the three schools, two working together in each room. One would explain the signals to be observed while her assistant manipulated the signal-box and announced the time to start and quit. There was splendid management in handling the tests and I have no criticism to offer on the fairness of the application of the tests. The children seemed to enjoy the game and so far as I could see took no notice of my presence or that of the master who accompanied me to their room. 53 cadets were busy in these tests after being trained by Miss Carrigan for three days. Another test was given the second week in April, 1914, but it will be several weeks before results can be known. These tests are to (1) set definite standards for each grade, (2) measure the results of each teacher's work, (3) assist in motivating the children's work, and (4) to furnish some studies in the grading.

Criticism of Standardization.—It is proper that I give some discussion upon the general proposition to attempt a "standardization" of the achievements in Arithmetic, which is, after all, only a subordinate notion of "standardization" in all studies. There appears a strong tendency to-day to try to standardize everything, products and producers alike, and educational circles seem to have been caught in the current. The trades are said to have a definite number of doors for a carpenter to hang in a day, or a specific product to be turned out, beyond which a good workman will not endeavor to go. With discriminating accuracy there are attempts to "standardize" in this world-movement not only Arithmetic, but also penmanship, compositions, cattle, peanuts and parents!

Courtis has selected a certain line of level from the thousands who have been tested by his method and sets these levels up as a standard for the schools everywhere. This would not seem so serious did we not find him saying (31, 14):

> "It should be noted that standards will *not* produce uniform products unless they are treated both as goals to be reached, and as limits not to be exceeded."

He points out that the average score, for instance, of 11,059 8th grade pupils on test No. 7 was 9.5 examples correctly done, but 38% of these pupils had been so overtrained that they exceeded this score by 10% to 100%. "These high scores of school children represent waste effort." "When standard ability has been attained, *additional* degrees of mechanical skill are products of the least importance."

While the writer is in complete sympathy with every attempt to place Pedagogy upon a sound and genuine scientific basis, he does not consent willingly to the effort to "Procrusteanize" the schools by requiring them to be measured and directed by semi-arbitrary standards. Abilities of children are too widely variant and future callings are too diverse for us to agree that each child in the great public school system shall be moulded into the same set form in Arithmetic, or, indeed, in any school subject, by accepting standards which are to be reached but not exceeded. The present movement is awakening much interest among the school public and must result in good. Its chief temptation lies in the extravagant application of some of its obviously useful features until the practical educator will be led to reject even what help it should be able to offer.

The selection of a semi-arbitrary standard in Arithmetic has gone no farther than the four fundamental operations and simple problems in reasoning, and has not approached fractions, denominate numbers, ratio, percentage, mensuration,—yet to me it seems much like taking the average per-acre corn crop of the country, or more correctly, of a few sections, and setting this up as a "standard" to be reached but not exceeded by farmers everywhere! Boys' Corn Clubs have shown the corn raisers the fallacy of taking "averages" as standards. It is a little similar in educational work. As land differs in fertility, so children differ in *Begabungen* or talents. As farmers differ in their methods of cultivation, so parents and teachers differ in *Erziehung*. We may have to leave the *Begabungen* with the biologist and the eugenist; but with more fertile methods of instruction, with a more socialized curriculum, it is possible for these experimental studies to become " stepping-stones " upon which we may rise to higher things. At all events we should recognize and respect, nay more, develop and encourage the *individuality* in every child.

TABLE E

Distribution of Arithmetical Topics in the Grades in American Cities*

All figures are to be read as percentages

Topic	Cities having it	1st grade	2nd grade	3rd grade	4th grade	5th grade	6th grade	7th grade	8th grade
Numbers introduced	all	71.5	22	6.5	..	..	..	..	..
Fundamentals completed	all	..	..	5	78	17	..	..	..
Common fractions begun	all	14	21	17	21	27	..	..	..
Fractions emphasized	all	..	..	2	10	63	23	2	..
Decimal fractions taught	all	..	..	..	9	32	40	13	6
Ratio	all	..	..	..	5	8	11	20	56
Percentage, general cases	all	..	..	..	5	30	45	20	..
Simple interest	all	..	..	..	..	5	20	45	30
Compound interest	64.7	..	..	..	..	..	5	40	55
Commission	all	..	..	..	..	..	15	55	30
Commercial discount	all	..	..	..	..	..	10	50	40
Bank discount	all	..	..	..	..	..	..	40	60
Exchange	42.8	..	..	..	..	..	..	23	77
Stocks and bonds	71.4	..	..	..	..	..	..	23	77
Partial payments	60.7	..	..	..	..	..	5	20	75
Partnership	57.1	..	..	..	..	..	..	28	72
Simple proportion	all	..	..	..	..	..	12	21	67
Compound proportion	42.8	..	..	..	..	..	..	24	76
Mensuration,—of plane figures	all	..	..	..	10	12	20	30	28
Mensuration,—of solids	all	..	..	..	..	12	18	25	45
Square root	all	..	..	..	..	..	..	15	85
Cube root	28.5	..	..	..	..	..	..	25	75
Factoring	all	..	..	..	12	33	25	18	12
Least common multiple	all	..	..	..	15	37	34	10	4
Greatest common divisor	all	..	..	..	12	37	37	10	4
Metric system	35.7	..	..	..	..	..	..	28	72

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* In the above table the distribution of the topics is given for 28 American cities reporting to the American Committee of the International Commission on the Teaching of Mathematics, and published in the U. S. Bureau of Education Bulletin No. 13, 1911, pp. 16-65, 75-78. These cities represent about one-tenth of the scholastic population in the United States.

TABLE F

IMPORTANT FACTS ABOUT THE EXPERIMENTAL STUDIES IN ARITHMETIC

Investigator	Country	Subjects	Date*	Purpose of experiments
1. Phillips, D. E.	America	260 children	1897	Popularity of arithmetic
2. Lewis	England	8,000 “	1913	“ “
3. Messenger	America	6 adults	1903	Kinds of thinkers
4. Nanu	Germany	7 “	1904	“ “
5. Freeman	“	14 “ 14 children	1910	Differences in adults and children
6. Lobsien	“	....	1913	Sex differences
7. Ballard	England	....	1912	“ “
8. Smith	America	3,869 adults	1895	“ “
9. “	“	9,307 “	1895	“ “
10. Phillips, F. M.	“	69 children	1913	“ “
11. Courtis	“	27,171 “	1912	“ “
12. Voigt	Germany	....	1912	“ “
13. Brown	America	51 children	1911	Effect of drill
14. “	“	222 “	1912	“ “
15. Phillips, F. M.	“	69 “	1913	“ “
16. Starch	“	15 adults	1911	“ “
17. Thorndike	“	33 “	1908	“ “
18. “	“	19 “	1910	“ “
19. Donovan and Thorndike	“	29 children	1913	“ “
20. Kirby	“	1,338 “	1912	“ “
21. Hahn	“	192 “	1913	“ “
22. Wells	“	10 adults	1910	“ “
23. Whitley	“	9 “	1912	“ “
24. Jeffrey	Scotland	18 children	1912	“ “
25. Kirby	America	1,338 “	1912	Effect of long and short drills
26. Whitley	“	9 adults	1912	“ “ “
27. Thorndike	“	16 “	1913	“ “ “
28. Wells	“	6 “	1912	Permanency of improvement
29. Kirby	“	258 children	1912	“ “
30. Brown	“	51 “	1911	“ “
31. Ranschburg	Hungary	153 “	1909	Relative difficulty of fundamentals
32. Phillips, D. E.	America	440 “	1897	Relative difficulty of fundamentals

* The dates given are those for the year in which the experiments were made when these were obtainable; otherwise, for the year when the results were published.

TABLE F—Continued

IMPORTANT FACTS ABOUT THE EXPERIMENTAL STUDIES IN ARITHMETIC

Investigator	Country	Subjects	Date*	Purpose of experiments
33. Phelps.......	"	270 "	1912	Relative difficulty of fundamentals
34. Cole.........	"	35 adults	1912	Adding upward and downward
35. Arnett.......	"	8 "	1905	Manner of adding
36. Paine........	"	12 children	1913	Motivationthrough store-keeping
37. Phillips, D. E.	"	224 "	1897	Effect of change in wording
38. Courtis.......	"	317 "	1909	" " "
39. Winch........	England	32 girls	1909	Correlation and transfer of abilities
40. "	"	43 "	1909	Correlation and transfer of abilities
41. "	"	38 "	1909	Correlation and transfer of abilties
42. "	"	35 boys	1910	Correlation and transfer of abilties
43. "	"	72 "	1910	Correlation and transfer of abilties
44. Rice.........	America	6,000 children	1902	Comparative results of schools
45. Stone........	"	6,000 "	1908	Results of six years' work
46. Courtis.......	"	317 "	1909	Speed, accuracy and reasoning
47. "	"	9,000 "	1911	Standardization of aims
48. "	"	27,171 "	1912	Abilities as related to standards
49. "	"	25,000 "	1913	" " "
50. Carrigan.....	"	20,646 "	1914	" " "

* The dates given are those for the year in which the experiments were made when these were obtainable; otherwise, for the year when the results were published.

V. DISCUSSION AND PEDAGOGICAL DEDUCTIONS

Several facts seem to stand out quite clearly in these experimental studies. Some of the more prominent ones are: (1), Inadequate results are now being obtained in Arithmetic in practically all schools; (2), Courses of study, judged by experts as superior, give no better results than those judged as inferior; (3), The better educated teachers are not having more success than the less educated ones; (4), Small expenditure of time devoted to drill upon fundamentals under optimal conditions gives surprising mechanical skill, which remains fairly permanent; (5), The paradoxical situation has received no adequate and satisfactory explanation up to the present time.

With painstaking care, Rice, in his pioneer investigations a decade ago, eliminated one by one the elements that he thought had any bearing upon the cause of such poor mastery of Arithmetic and finally left the burden upon the superintendent and the system of examinations employed in the schools. However, I believe he was far from the proper diagnosis. The whole trouble, when we come to the ultimate analysis of the case, lies in the failure of the pupils to comprehend what they pass over in Arithmetic,—they *lack an orderly association of the principles* of the subject, and *they do not have their fundamental and hierarchical systems of mathematical habits well established.* Bryan and Harter (16a, 360) tell us that "A man is organized in spots—or rather in some spots—far more than in others. This is true structurally and functionally." "Some habits are knit together in a hierarchy."

> "There are a certain number of habits which are elementary constituents of all the other habits within the hierarchy. There are habits of a higher order which, embracing the lower as elements, are themselves in turn elements of higher habits. A habit of any order, when thoroughly acquired, has physiological and, if conscious, psychological unity. The habits of lower order which are its elements tend to lose themselves in it, and it tends to lose itself in habits of higher order when it appears as an element therein."

Proficiency in Arithmetic rests pre-eminently upon a mastery of habits associated in hierarchical fashion. Here, perhaps more than in any other school subject, does a ready habitual response indicate efficiency, and as Horace Mann might say (52a, 236): "One former is worth a hundred reformers." With our new psychology we are needing a few new canons for Arithmetic. Bryan and Harter say (16a, 375):

> "Now the ability to take league steps . . . , in addition, . . . , plainly depends upon the acquisition of league-stepping habits. No possible proficiency and rapidity in elementary processes will serve. The learner must come to do with one stroke of attention what now requires half a dozen, and presently in one still more inclusive stroke, what now requires thirty-six. He must . . . acquire a system of habits corresponding to the system of tasks. When he has done this he is master of the situation in his field. . . . Finally, his whole array of habits is swiftly obedient to serve in the solution of new problems. Automatism is not genius, but it is the hands and feet of genius."

If these authors are right, then it is the first business of the teacher in Arithmetic to see that the right habits are formed from the beginning and that the fundamental habits which enter into higher ones later on shall be intelligently approached by the teacher. Certainly, no other branch of school work utilizes more the first habits in the formation of those that follow. The child's first experience with numbers in school should be made to assist it in his next step and the earliest drills in addition should be the stepping-stones to higher functioning in the work that follows. One great fault has been that schools have sought to introduce children to the mastery of problems involving situations when the children should have been mechanizing the processes of the fundamentals. The preadolescent period in school is distinctively the psychological age for drills; it is not the period to demand either reasoning or imagination upon the part of children. Hall (52a, 313) says: " Puberty is the birthday of the imagination," and it is discouraging and wasteful to thrust verbal propositions upon young children, requiring them to wrestle with the interpretation of a complex situation, when they should be establishing a whole federation of hierarchies of mathematical habits, so that there will be both speed and accuracy in responses when there is need for them. We shall profit greatly if we return to the discarded oral Arithmetic, and give patient, systematic drills upon rapid adding, subtracting, multiplying and dividing, without pencil or crayon. Hundreds of examples should be announced orally by teachers in these four fundamentals, and the children taught to respond quickly. In this way the lower habits of association are formed. With proper drills there is every reason to believe that children in the sixth and seventh grades will far surpass the present status in those grades. These rapid elementary processes favor prompt fusion into the higher unitary processes, and are also favorable for prompt reactions when new emergencies arise. Since one's response to a situation depends partly upon the rate of mental and nervous processes, but " far more upon how much is included in each process," it will be seen how necessary it is to present only simple stimuli until they have been mastered. In almost any regular class in Arithmetic can be seen pupils who add, subtract, multiply and divide with great speed, while others are going along at moderate pace, and still others are laboriously struggling with the most elementary processes by means of objective helps, like the fingers. Perhaps, the rapid worker expends less energy and finishes in one-fourth the time, because his federation of habits has done his work for him, so to speak, while the other pupils have been going over the ground as if it were strange territory to them. The main habits to be drilled into the young arithmetician are: (1) rapid association of numbers in the four fundamental processes; (2) accuracy in computations; (3) alert and keen attention to statement of examples and problems; and (4) quick application of the proper process to new situations. Teachers should be extremely careful to avoid arrested development in the lower order of habits,—so often seen in children in the public schools. By starting right, and establishing the lower habits well, it is easy to follow with the proper sequence of simple habits, on up into the organization of the higher groups, or hierarchies.

If I am right in placing the first burden of responsibility upon the individual teacher, there is to be an equal sharing with the authors of texts in Arithmetic. In no other subject in the curriculum does the structure of the text-book determine so largely the teacher's procedure as in Arithmetic. The majority of public school teachers follow closely the order of topics and the exact rules of treatment laid down in the book. Small change is ever made in any of the material presented. It is taken explicitly, and no adaptation is made to specific needs of classes or individual pupils.

It is also true that Arithmetic demands, more than other branches, an orderly association, not only of its fundamental facts, but even more emphatically, a related and orderly grouping of all the subsequent topics. It follows from these desiderata that the improvement in results in Arithmetic must begin far back in the treatment of the topics by the authors of series of texts for school use. We shall hardly have better accomplishments among pupils until our texts are built upon more psychological and pedagogical lines. The present books are characterized by unnecessary and indefensible separation of genetically related topics that are given to the children as wholly new and unrelated; and as a consequence the memory is overworked with rules, formulas and model solutions, and there is no systematic mastery of the topics, no orderly association of the principles involved, and no formation of definite habits of response. There should be ample drills provided in pure numbers for the first four grades at least, with emphasis upon the processes, and then a gradual development into the other topics in such a manner as to show the genetic growth and derivation of the later from the earlier topics.

VI. Suggested Norms For Text-Books

In order to bring together the best possible talent and experience for the making of texts in Arithmetic, there is needed the joint counsel of the business world to decide the most necessary topics to be included, of the pedagogist to tell what are the practical reactions of children in the school-room, and of the psychologist to follow out the latest suggestions of scientific discovery in the laws of mental behavior and growth.

Two prime questions are met in the preparation of the text-book:—(1) What topics are to be included; and (2) how shall they be treated,—as dissociated from the child's experience for purely cultural purposes, or as topics which deal with situations within the range of the child's daily life? An examination of the Arithmetics used now discloses the persistence of some topics from the remote past, even despite the fact that the practical business world long ago discarded them or has modified them almost beyond recognition. Partnership with Time was inherited from the Hanseatic League, which made practical use of it, but it has remained in the books for generations after it has been of any service, as an example of the conservatism of tradition. One sees small reason for including in any text for general school use such topics or subtopics as the Vermont Rule in Partial Payments, or even Partial Payments itself, or Foreign Exchange, Troy Weight, Apothecaries' Weight, Surveyor's Measure, Brick Layers' Work, Plastering, Lumber Measure, etc., any more than to put in also Bakers' Rules, Tailoring, Livery, Tobacco Manufacturing, Stock Raising, Dress Making, and scores of other special lines in which arithmetical laws may be of great service. The Metric System has no place in the grades of our American schools. The entire school should not be compelled to study something that only a small percentage of the pupils will ever get to use in scientific work later. It may well be made a part of high-school mathematics when it is needed.

Without further negative discussion, the following topics are suggested as reasonable and adequate to the real needs of the public schools:

1. Numeration and Notation. Hindu and Roman both to be presented.
2. The Four Fundamental Operations, Subtraction by the Austrian and Division by the Italian method.
3. Tables of Denominate Numbers, to include U. S. Money, Long, Dry, Time, Liquid, Avoirdupois, Square, Cubic, and Circular Measures.
4. Five Secondary Topics,—all possessing the Ratio Idea.
    - (a) Common Fractions,—approached from the side of Division.
    - (b) Decimal Fractions,—presented as a special form of common fractions whose denominator is always some multiple of 10, the numerator alone being written and the denominator indicated by the position of the point.
    - (c) Percentage,—presented as a special form of Decimals, with 100 as its denominator. Many practical problems touching such business lines as the majority of people come into contact with.
    - (d) Ratio,—which is only a special form of writing a common fraction, placing a colon vertically between numerator and denominator instead of a horizontal line between them in the usual manner.
    - (e) Proportion,—simply an equality of ratios.

5. Square and Cube Root.
6. Mensuration: A distinct and separate subject to be approached objectively, with real objects and figures.
   (a) Rectilinear Surfaces: rectangles, and triangles.
   (b) Solids: including prisms, pyramids, cylinders, cones and spheres.

Under these six divisions the essential topics in general have been presented. An appendix might easily be added to suit particular communities, but it seems poor economy for publishers and the public to have a burden of highly specialized problems in the general text-book. In the appendix rural communities could be provided with rural problems, and those confined to strictly factory communities with problems suitable to their practical needs. It is not to be overlooked that the first six grades especially are to be provided with many more examples for drill purposes than are ordinarily afforded now. The Germans have always outdistanced us in this feature of arithmetical work. Their plan of publishing *Hefte* which contain from twenty to one hundred and fifty pages of examples, and selling for three to twelve cents each, has much to commend itself to us. Hentschel's *Neue Rechenfibel,* for instance, contains 32 pages, 3,760 examples, and sold for 3¾ cents per copy. The French have issued many problem manuals for use in their schools, selecting much material from the official examination lists. We can improve this feature of our arithmetical work either by adding special appendices when it is desirable to have the examples and problems for drill in the same text with the development of the general theoretical side, and by the issuance of separate booklets of drill exercises in other instances.

Examples and Problems.—All arts and sciences have a right to their own technical nomenclature. Their terms, of necessity, must be more specialized than these terms are when used in the ordinary way. For this reason there seems to be a need of making a distinction between the exercises which deal only with pure numbers and those which apply numbers in stated situations. The writer believes it would be a great help if all text-books in Arithmetic would refer to all exercises in pure numbers as "Examples," and to all exercises in applied numbers as "Problems." Both oral and written exercises could be given under each one of these classes.

Algebra and Geometry—It will not appear radical now to advocate the introduction of some elements of Algebra and Geometry into the public school Arithmetic text. In handling numbers in the grammar grades the equation is of much service. In mensuration especially it is necessary to appeal to Geometry, as little intelligent work can be done there without some knowledge of geometrical figures and facts. In German and French schools use of these subjects has been resorted to for many years to illuminate the processes in Arithmetic. It is not advisable to eliminate Arithmetic from the 7th and 8th grades in order to introduce separate texts in Algebra and Geometry. A gradual introduction of these principles may begin in the 5th and 6th grades, and proceed with some definite matter fused with the more specific arithmetical facts. There is also an evident need of continuing Arithmetic into, if indeed not entirely through, the high-school. All the tests so far made show a lamentable weakness in Arithmetic in the higher grades. Recently Stratton (118,336) has emphasized the need of sympathy between Arithmetic, and Geometry and Algebra. Too many teachers of secondary schools belittle Arithmetic, forgetting that the higher work depends upon it While the pupil has outgrown many of the minor problems he must still keep in close touch with arithmetical calculations in his more generalized mathematics. In 52 schools reporting to the American Committee of the International Commission on the Teaching of Mathematics, 19 introduce Algebra in the 7th and 8th grades as Algebra, and 3 have work in Geometry other than what is needed in mensuration. In the schools of Germany, Geometry is usually begun now in the 6th grade. Out of 23,351 departments reporting in England 1,383 chose Algebra as an elective. Geometry is taught in about one-fourth as many departments. It seems advisable to begin these two subjects early as companion subjects along with Arithmetic and continue Arithmetic into the high-school work. For this purpose the text-books should present all the necessary material.

VII. Some Suggested Norms For Teaching

The many comparative experimental studies that have been made clearly demonstrate the fact that good courses of study, good superintendence, and well-educated teachers with plenty of equipment do not insure fruitful results. The Macedonian cry comes today from a multitude of teachers. Dyer in his recent report to the Boston School Committee (38,11) says: "The immediate and most urgent need felt by teachers is fresh light upon the art of teaching." The writer has been in somewhat close touch with the rural schools in the Mississippi Valley for the past two decades and he knows this condition that Dyer says exists in Boston is quite general,—this one continuous entreaty for assistance. We have had an affluence of theory and a poverty of serviceable help in actual practice. Arithmetical texts should not be laden with pedagogic instruction to teachers. They need to avail themselves of the privileges afforded in State and City Normal schools, in Educational Departments in State Universities, in Teachers' Associations and Institutes, in works on pedagogy, and in school journals in order to get the most help in methods of teaching. This does not lessen the value of good text-books, built upon clear, pedagogical lines. Teachers who can really teach Arithmetic,—and the other common school subjects,—with life, with delight, throwing around each recitation the best affective atmosphere so that every activity of pupil and teacher will be properly motivated, are today in great demand. Is not the dread of failure in school work the worst kind of failure?

Drill on Fundamentals.—Children enter school with some notion of number already formed, as has been shown. The teacher's early work with them should be intelligently based upon what they already know, and should keep in close touch with the child's mode of arriving at his first number-concepts. No book is needed. Abaci, splints, counters, and cards with large dots upon them may be used. Together with the presentation of sense-stimuli to be counted both simultaneously and in succession, the child soon may be taught the number-symbols. Many children know these before entering school and it is well for the teacher to lead gently the child's interests rather than to attempt to drive or force them. No child seems to be exclusively visual-minded, or solely auditory-minded, or totally motor-minded, but each child is all of them at once, and may learn one fact in one channel and another fact in another channel. So the primary teacher will avail herself of all the means at hand to give the concepts of number in the completest and happiest forms, partly by presentation, partly by counting, and many times through the child's own movements. As has been earlier pointed out, children delight to count, perhaps because they can do it. Like older people they, too, worship at the shrine of achievement! It is also wise to have them measure and compare objects for basic work, but it is learned foolishness and pedagogic folly to insist, either in texts in the lower grades or in teaching Arithmetic in the grades that every time one divides 27 by 9 that 27 is necessarily "measured by the 9 and is therefore concrete." When written work is introduced it is better to place the digits under each other instead of in equation form as is the practice so generally in the first grade, since the future arrangement will be with figures under each other. Thus,

$$\begin{array}{cccccccccccccccccc} 1 & 4 & 6 & 2 & 3 & 4 & 7 & 4 & 5 & 9 & 6 & 1 & 7 & 8 & 2 & 5 & 3 & 9 \\ 3 & 2 & 1 & 4 & 5 & 3 & 2 & 5 & 2 & 3 & 3 & 5 & 1 & 1 & 6 & 3 & 2 & 3 \\ \hline 4 & 6 & 7 & 6 & 8 & 7 & 9 & 9 & 7 & 12 & 9 & 6 & 8 & 9 & 8 & 8 & 5 & 12 \end{array}$$

These are given merely as a suggestion on the *form* in which the very first written operations in addition should be expressed and no order of subject-matter is here attempted. The child should be given those forms and symbolic statements which he is to use first and new ones are to be brought in only as he needs them. Arithmetic should be adapted to the child and not vice-versa. It is best to use written subtraction in the Austrian form and written division in the long form by the Italian method. In all the four fundamental operations constant and consistent drill is required until the mechanical processes become habitual. If children are to be expert in handling numbers they should be thoroughly trained in the fundamentals before they come to the age of puberty. All the experimental studies warrant this conclusion. This appears to be the strategic time to emphasize work and drill with pure number, with examples, according to the definition set forth here.

Why Are Problems Harder Than Examples?—In examples the child has his processes clearly indicated for him in their statement. In problems, the case is very different. He has to "orient" himself arithmetically among words, words, words, which too frequently are scarcely within his comprehension. As was mentioned under the experimental studies, marked variations have been found in the difficulties of problems by a change of their wording. The pupil must know the meaning of all words used in the problem and also know the situation presented, and this demands that it deal with objects and situations familiar to the child. An intelligent and independent solution is possible only when the language employed is within his vocabulary and the situation within his experience.

Tables of Weights and Measures.—Early in the child's school experience the simpler measures, such as Long and Liquid Measures may be begun objectively, since most children at school entrance have a little knowledge of some of the units, such as foot, yard, gallon, pint, etc. All the tables should be approached as objectively as possible, so judgment may precede and strengthen memory. Longitude and Time is practical now only when the Standard Time belts are used.

If it is approached from the geographical side, with proper drill upon the earth's rotation, it will not be necessary to commit rules about "when both points are east" or "when one is east of the prime meridian and one is west," since the mind grasps the situation objectively.

Fractions, Percentage, and Ratio.—At school entrance most children know what is meant by ½, ⅓, and possibly, ¼. Up through the first four grades the common fractions are gradually employed as they are needed, but in the 5th grade they come in for fuller systematic treatment. Decimal fractions should follow a good understanding of common fractions, and should always be taught as a special form of common fractions, which themselves should be based upon Division. Any common fraction whose denominator is 10, or some multiple of 10, may be written as a decimal by simply writing its numerator and indicating its denominator by an agreed conventional use of the period for a decimal point. Percentage should be taught in very close relation to decimal fractions, since it is based upon the decimal whose denominator is *always* 100. If the genetic relation between common and decimal fractions, and between decimals and Percentage is clearly developed inductively these subjects will be vastly easier to teach and to learn than if they are taught as separate and unrelated subjects, as is so frequently done.

Solution of Problems.—The writer has found in teaching Arithmetic to several hundred Normal School students, the majority of whom had taught before entering his classes, three distinct hindrances to the intelligent solution of problems,—*Rules, Formulas, and Model Solutions.* If text-books give rules or formulas or model solutions, students of advanced experience even are inclined to lean heavily upon them. This would suggest alertness upon the part of teachers in the grades to make sure that children are proceeding intelligently and are thinking the relations in the solutions. When a problem is attacked, the first step should be to read it carefully and pick out all the things that are granted, and to learn next what is to be found. One set of solutions here will serve to exemplify what is meant and also to correct some erroneous ideas that are found still in considering problems in Percentage. Keeping in mind all that has been said on the origin and nature of Percentage and the procedure with problems in general, let us take this problem:—

"If some goods are sold at a profit of 12½%, for $1,012.50, what did they cost?"

Smith (105,74ff) in his latest book on Arithmetic uses this problem to show three erroneous methods of solution, and decides that the way out of the difficulty lies in employing an algebraic symbol for the *cost*. He entirely overlooks the intimate relation between Percentage and Decimal Fractions and treats it as a distinct part of Arithmetic, and this is a common weakness of arithmetical texts. His erroneous solutions, so far as they are arithmetical, should extend to four and include his own! *Unnecessary* appeals to Algebra cannot be sustained. When it is needed to use algebraic or geometrical principles to economize time and energy or in heightening the lucidity of the solution, no objection will be raised, but when this is made necessary because of a lack of proper connection between arithmetical topics, then it is to be condemned. If the *Hundred-hundredths* base-idea is grasped in Percentage, Smith's reasoning will be seen to deal with some "straw" solutions. Coming back to the problem proposed for solution we shall first read it, and require that the facts granted, and the results asked for shall be clearly set forth before the solution proceeds and we have:

Granted (1) Selling price = $1,012.50
(2) Gain per cent = 12.5

Required (3) Cost = what?

(4) 100% + 12.5% = 112.5%
Since (5) 112.5% of the cost of the goods = $1,012.50
Then (6) 1% " " " " " " = 9
And (7) 100% " " " " " " = 900

Hence (8) The cost of the goods = $900

The words before the numbers of the equations are given merely to suggest the grouping of the facts of the problem, but are not necessary in the pupils' written work. Since the gain has been expressed in *per cent* in the problem, it is the most natural procedure to take 100% as the basis in the solution. When this fact is seen the rest of the work is self-evident. This is in perfect harmony with such solutions as the following:

1. Find three-eighths of 24. Shall we let 5/5 equal 24, and then reason ourselves into adopting an algebraic symbol before we can solve this? Evidently, since the cue has been suggested in the fractional part, *three-eighths*, the obvious plan is this:
Since 8/8 of 24 = 24; then, 1/8 of 24 = 3; and 3/8 of 24 = 9.

2. Find 37.5% of 24.
Since 100% of 24 = 24; then, 1% of 24 = .24; and 37.5% of 24 = 9.

3. 15 is 5/8 of what number?
Since 5/8 of a number = 15; then, 1/8 of it = 3; and 8/8 of it = 24.

4. 15 is 62.5% of what number?
Since 62.5% of a number = 15; then, 1% of it = .24; and 100% of it = 24.

This "unitary analysis" method grows directly out of the processes of common fractions, and is to be preferred to any method that is satisfied to get the "answer," and cares nothing about the relations of the separate steps in the work. The numbering of the steps has been found of some practical service in referring to the solutions, and is not an essential part of the work,—much as the pages of a book are numbered for convenience, but have no bearing upon the content of the book itself.

Inaccuracies.—Many text books and more teachers are careless in arithmetical statements. Each equation should be true within itself and should be as carefully expressed as accuracy demands. Arithmetic is nothing if it is not exact and accurate. One often finds the continued equation in books, somewhat like this: $6 \times 2 = 12 \div 4 = 3 \times 5 = 15$, in which the various members are not equal. The trouble arises in an attempt to put two or more separate steps into one statement. While the continued equation is *sometimes* true arithmetically, it is *never* correct grammatically. The equality sign is the principal verb, and the second member its object, which cannot properly serve both as the direct object of one verb and be the subject of the next principal verb! Many authors also continue to use such expressions as: "100% = $660," and "Let 100% = $660," entirely disregarding the fact that *per cent* always means *hundredths* and that, therefore, *100% can equal nothing but 1 or some expression reducible to unity.* To say "100% = $660 is to say that 1 = $660; and to "Let 100% = $660 is to let 1 = $660, which is too apparently false to need further mention. The % sign should not be treated as an unknown quantity in Algebra. Yet, this fundamental error in handling this simple matter has led to endless confusion in the treatment of Percentage in the public schools.

Sources of Error.—The mistakes commonly found in the work of pupils in solving problems have these sources: 1. Mistakes in reading the problem, (a) reversing figures, (b) not getting the meaning of the words, or (c) not understanding the situations involved, with what facts are granted and what is required; 2. Inability to decide upon the processes to be used; and 3. Errors in computation. Each one of these mistakes calls for a specific kind of drill for its rectification. Careful work in the lower grades can do much to avoid them in the later work of the children.

Abstract and Concrete Numbers.—It is the belief of the writer that much useless and wasteful philosophising is attempted in the treatment of numbers in the grade work. It ought not to be regarded as sound pedagogy to try to force upon children the introspective and ratiocinative deductions of psychologists and philosophers about the nature of number. One may seek to discredit this position by calling it an appeal to the naive and *laissez faire,* but the suggestions have sufficient provocation. In his new book, Stamper (113, 29) would almost confuse a philosopher with such statements as:

> "Number is necessarily abstract." "The term abstract number strictly speaking expresses a redundancy, for number is essentially abstract. . . . The abstract idea of number should be considered in multiplication and division problems. In multiplication, the multiplier is abstract, the multiplicand and product being concrete. . . . In division, the dividend is always concrete." (p. 30.)

One cannot withhold the conviction that Stamper, although supporting the counting psychosis as the origin of number, since he says (p. 29): "Number has its origin in the counting process," yields to McClellan and Dewey when they state (76, 137):

> "The multiplicand must always represent a number of (primary) units of quantity (a measured quantity), and is commonly said to be concrete." "From the relation existing between multiplication and division, it is seen that in division the dividend,—or multiplicand as being a product of two factors,—always represents a measured quantity, *i. e.,* it is concrete; the divisor may denote either a concrete quantity or a pure number and the quotient is, of course, numerical in the one case and interpreted as concrete in the other."

This philosophical reasoning has played havoc in practical school work, since teachers have striven to foist it upon the children even in the lower grades. Allen well says (2,383):

> "If the child sees that each of seven boys has 5 cents, and wants to know how many all have, he will have little doubt as to whether he is repeating "5 cents" "seven boys times," or "seven cents times" or just "seven times" and *he will need no rule about abstract multipliers."*

In other words, the natural movement of mind in handling these number combinations is more certain and more direct, if left unhampered by philosophical considerations and artificial rules. Wark (131, 162) claims:

> "The most elementary counting, even that stage when the counts were not carried in the mind, but merely in notches on a stick or by DeMorgan's stones in a pot, requires some thought; and the most advanced counting implies memory of things. *The terms, therefore, abstract and concrete number, have long since ceased to be used by thinking people."*

Recently the writer visited an Arithmetic class in a State Normal and saw a group of practically adult students confused about this very question concerning abstract and concrete numbers, according to their previous training in the conventionalities of the text-book. Their teacher diverted the work of the hour and she and the class spent almost the whole period in re-establishing the requirements "that the product must always be the same kind of unit as the multiplicand," and "addends must all be alike to be added." This is not an exceptional case. Throughout the whole range of teaching Arithmetic in the public schools pupils are obfuscated by the philosophical encumbrances which have been imposed upon the simplest processes of numerical work. The time is surely ripe, now we are readjusting our ideas of the subject of Arithmetic, to revise some of these wasteful and disheartening practices. Algebra historically grew out of Arithmetic, yet it has not been laden with this distinction. No pupil in Algebra lets x equal the horses; he lets x equal the *number* of horses, and proceeds to drop the idea of horses out of his consideration. He multiplies, divides, and extracts the root of the *number*, sometimes handling fractions in the process, and finally interprets the result according to the conditions of his problem. Of course, in the early number work there have been the sense-objects from which number has been perceived, but the mind retreats naturally from objectivity to the pure conception of number, and then to the number symbol. The following is taken from the appendix to Horn's thesis (57), where a 7th grade girl gets the population of the United States in 1820:

7,862,166 whites people
233,634 free negroes "
1,538,022 slaves "
9,633,822

In this problem three different kinds of addends are combined, if we accept the usual distinctions. Some may say that this is a mistake,—that the pupil transformed the "whites," "free negroes" and "slaves" into a common unit, such as "people" or "population" and then added these common units. But this "explanation" is entirely gratuitous, as one will find if he questions the pupil about the process. It will be found that the child simply added the figures as numbers only and then interpreted the result, according to the statement of the problem, without so much mental gymnastics. The writer has questioned hundreds of students in Normal School work on this point, and he believes that the ordinary mind-movement is correctly set forth here, no matter how well one may maintain as an academic proposition that this is not logical. Many classes in the Eastern Kentucky State Normal have been given this problem to solve, and they invariably get the same result:

"In a garden on the Summit are as many cabbage-heads as the total number of ladies and gentlemen in this class. How many cabbage-heads in the garden?"

And the black-board solution looks like this each time:

29 ladies
15 gentlemen
—
44 cabbage-heads

So, also one may say: I have 6 times as many sheep as you have cows. If you have 5 cows, how many sheep have I? Here we would multiply the number of cows, which is 5, by 6 and call the result 30, which must be linked with the idea of sheep because the conditions imposed by the problem demand it. The mind naturally in this work separates the pure number from its situation, as in Algebra, handles it according to the laws governing arithmetical combinations, and labels the result as the statement of the problem demands. This is expressed in the following, which is tacitly accepted in Algebra, and should be accepted equally in Arithmetic:

> In all computations and operations in Arithmetic, all numbers are essentially abstract and should be so treated. They are concrete only in the thought process that attends the operation and interprets the result.

Mental, or Oral, Arithmetic.—Much oral drill should be given in all the first six grades. Processes should become almost automatic by the close of these grades. The German schools excel in *Kopfrechnen,* and our American schools can well afford to return to the practice of a generation ago in this matter.

The writer does not think that he has spoken the last word for improvements needed in teaching and in studying Arithmetic, but he does believe that he has pointed to some reliefs from the present discouragements in the results. There is no gainsaying his position that, in the ultimate analysis, the failure to respond quickly and correctly to problems in Arithmetic lies in the mental inability of the child. And beyond this fact we must remember that the child must do his own thinking in the subject. No superintendent, no teacher, no course of study, no text-book can do more than provide him with the proper stimuli and direction for his own development. Growth must come from within. Tests and experimental studies, such as have been brought together in this dissertation, will assist in discovering to us the child's reactions to numbers and to problems involving numbers, and in this way serve to adapt the means of the school to the ends of individual education. A sensible synthesis of all that has been found good in these studies, and that may yet be disclosed in similar investigations, will hasten the Renaissance in Arithmetic.

VIII. General Summary

1. Arithmetic is one of the chief subjects in the first eight grades of the schools throughout the civilized world. It receives about one-sixth of the total school time.

2. Children show some interest in numbers about the close of their fourth year, and at school entrance at six they have quite well formed ideas of numbers up to 8 or 10. Many are able to count 100 or more.

3. One school of educators holds that the number concept arises from simultaneously perceived groups of objects; another school holds that number is gained from successively perceived stimuli. One would teach by presenting many objects in a group; the other would teach by counting.

4. No definite correlation has been found to exist between the number systems employed by primitive peoples and their civil development. Number systems are known to arise readily when these are needed.

5. Both primitive peoples and children have a natural tendency to symbolisms and this fact makes the growth of the number symbols easy for them.

6. One group of educators advocates deferring number work until one or two grades have been completed by the child in school. Another group favors the usual practice of starting children in numbers as soon as they enter school at six years of age. The child's pre-school interest in numbers would support the latter group, while the successful number work reported by the English Infant Schools and by Montessori is also favorable to this view.

7. The influence of puberty upon arithmetical interests and abilities has been found to be very marked, and it should be clearly understood by teachers who handle children of the postpubertal period.

8. Drill work has been found exceedingly valuable for developing skill in handling numbers rapidly and accurately. Short periods are better than the same total time used in long periods of drill. The permanent effect of drill-work has been found to be much greater than was supposed.

9. Children are inclined to make certain habitual "type-errors." These should be carefully listed by teachers and made the subject of vigorous drill. Much time is squandered in going over matter which the children already know in most

schools, and energy is not concentrated upon the particular difficulties that should be attacked.

10. If problems in Arithmetic are made to deal with situations within the experience of pupils, the subject will be robbed of much of its present tedium.

11. The adoption of a "fixed standard" for achievement in Arithmetic, rather than a progressive one, threatens to work great harm in the schools. The criterion by which to judge the results of teaching should be a growing one, or stagnation will be encouraged.

12. The wording of problems, which are to be distinguished from examples, should receive careful attention in the text-books.

13. Great individual differences exist among children concerning Arithmetic. These variations range from dread aversion to the subject all the way to special favoritism for it. Early impressions received from parents, tutors, associates, and school experiences all seem to have some influence in determining the *Einstellung* of the pupils toward Arithmetic.

14. Girls have been found to excel boys generally in practical skill in computations, but boys are better than girls in reasoning upon number situations.

15. Children in the first five grades do not have the range of attention or the power of concentration that the children in the upper grades possess. The dawn of adolescence marks the dividing line between the two types.

16. Habits of rapid and accurate handling of numbers must be thoroughly established in the first five grades. Drill to this end should be begun as early as possible after school entrance, and carried forward with special care in the 3rd, 4th, and 5th grades. Habits of combining numbers quickly should be firmly fixed and hierarchies of habits should respond automatically to given processes, while whole federations of hierarchies should gather spontaneously to solve questions involving several processes. Much drill should be afforded with pure numbers, and a minimum of problems involving a study of situations resorted to.

17. Problems may be begun in the 6th grade with profit, and the work will be attractive and inviting if the pupils can perform the operations with ease.

18. Philosophical distinctions between abstract and concrete numbers are not to be urged upon the children in the elementary schools. However true these distinctions are in logic, to teach them in the grades serves no useful or needful end, and adds to the burden of dealing with practical applications of number.

19. Oral, or mental, Arithmetic deserves a wide place in the

early grades, and should not be omitted even from the upper grades. *Kopfrechnen* has a value that pencil and crayon can never supplant.

20. Instead of teaching Arithmetic in the eight grades of the elementary school, Algebra in the first two grades of the high school and Geometry in the last two high school grades, it would be better from several considerations to teach Elementary Mathematics through the entire twelve grades, introducing Algebra and Geometry as early as they can be of real service, and continuing Arithmetic into the high school.

21. Text-books in Arithmetic should have the combined experience and knowledge of the business man, the psychologist, and the pedagogist. If the authorship of texts combines these three interests, a much more practical and teachable book will result.

22. The derivative relation of Common Fractions, Ratio and Proportion to Division; of Decimals to Common Fractions; and of Percentage to Decimals should be clearly set forth in the text-books, beyond which so few teachers are disposed to go in their teaching. This change in the books would do more than any one other thing to clarify the topics, which stand now as apparently separate and unrelated topics to be treated independently.

IX. BIBLIOGRAPHY.

1. ALEY, R. J. and MCNIELL, I. C. Mathematics in the Grades. N. E. A. Report, 1908, pp. 569-576.
2. ALLEN, FISKE. Is Arithmetic a Science of Numbers or of Symbols? Kansas School Magazine, vol. 1, no. 9, Nov., 1912, pp. 378-384.
3. ALLING-ABER, MARY R. An Experiment in Education. New York, Harpers, 1897, 245 p.
4. ANDREWS, W. S. Magic Squares. Monist, vol. 15, pp. 429-461, 554-586. Magic Cubes. Monist, vol. 16, pp. 328ff.
5. ARNETT, L. D. Counting and Adding. Amer. Jour. Psychol., vol. 16, no. 3, July, 1905, pp. 327-336.
6. BADANES, SAUL. The Falsity of the Grube Method of Teaching Primary Arithmetic. New York University thesis, 1895, 47 p.
7. BAILEY, M. A. and COOK, JOHN W. The Teaching of Arithmetic in Elementary Grades. N. E. A. Report, 1895, pp. 380-387.
8. BALL, W. W. R. A Short Account of the History of Mathematics. London, Macmillan, 1888, 464 p.
9. BALLARD, P. B. The Teaching of Mathematics in London Public Elementary Schools. Ed. Dept., Great Britain Special Rep., vol. 26.
10. BOAS, FRANZ. Language and Thought. Introduction to the Handbook of American Indian Languages. Washington, Gov. Print. Office, 1911, 1069 p.

11. Branford, Benchara. A Study of Mathematical Education, including the Teaching of Arithmetic. Oxford, Clarendon Press, 1908, 392 p.
12. Brooks, S. D. Annual Report of the Superintendent, July, 1910, School Document No. 10, 1910, Boston Public Schools.
13. Brown, J. C. An Investigation on the Value of Drill Work in the Fundamental Operations in Arithmetic. Jour. of Ed. Psychol., vol. 2, Feb., 1911, 81-88; vol. 3, Nov., 1912, 485-492; Dec., 1912, 561-570.
14. Brown, William. The Psychology of Mathematics. Child Study, vol. 6, March and April, 1913, 24-26; 42-47.
15. Browne, C. E. The Psychology of the Simple Arithmetical Processes. Am. Jour. Psychol., vol. 17, 1906, 1-37.
16. Bruce, H. A. B. Bending the Twig. American Magazine, vol. 69, 1910, 690-695.
16a. Bryan, W. L. and Harter, N. The Telegraphic Language. Psych. Rev., vol. 6, no. 4, July, 1899, 345-375.
17. Burnham, W. H. Arithmetic and School Hygiene. Ped. Sem., vol. 18, 1911, 54-73.
18. Cajori, Florian. A History of Mathematics. New York, Macmillan, 1894, 422 p.
19. Calfee, J. E. Rural Arithmetic. Boston, Ginn and Co., 1913, 119 p.
20. Campbell, C. V. Courses in Arithmetic. N. Y. Teachers Monographs, 1912, 28-34.
21. Carmichael, R. D. A Lesson from the History of Numbers. School Sci. and Math., vol. 13, no. 5, May, 1913, 392-399.
22. Chartres, W. W. Teaching the Common Branches. Boston, Mifflin, 1913, 355 p.
23. Cole, L. W. Adding Upward and Downward. Jour. Ed. Psychol., vol. 3, Feb., 1912, 83-94.
23a. Colburn, Warren. Teaching of Arithmetic. Elementary School Teacher, vol. 12, June, 1912, pp. 463-480.
24. Conant, L. L. Historical Development of Arithmetical Notation. Ped. Sem., vol. 2, 149-152.
25. —— ——. The Number Concept. New York, Macmillan, 1896, 218 p.
26. Cosby, Byron. Arithmetical Teaching,—An Experiment in the Mound City, Mo., Public Schools. School Sci. and Math., vol. 11, 1911, 629-634.
27. Courtis, S. A. Standard Tests in Arithmetic. Jour. Ed. Psychol., vol. 2, 1911, 272-274.
28. —— ——. Standard Scores in Arithmetic. Elementary School Teacher, vol. 12, Nov., 1912, 127-137.
29. —— ——. Measurement of Growth and Efficiency in Arithmetic. Elementary School Teacher, vol. 10, Oct., 1909, 58-74; Dec., 1909, 177-199; vol. 11, Dec., 1910, 171-185; March, 1911, 360-370; June, 1911, 528-539.
30. —— ——. Report on the Courtis Tests in the City of New York, 1911-1912. Interim Report, Committee on School Inquiry, Board of Estimate and Apportionment. 1913, 158 p.
31. —— ——. Bulletin No. 2, Courtis Standard Tests. Detroit, Aug., 1913, 44 p.
32. Dawson, N. H. R. Simplification of Arithmetic. U. S. Com. Ed. Rep., 1886-7, 238-239.
32a. Dearborn, G. V. N. Moto-Sensory Development. Baltimore, Warwick & York, 1910, 215 p.

33a. Decroly, Dr. M. le, and Degand, Mlle. Julia. L'evolution des notions de quantites continues et discontinues chez L'enfant. Arch. d. Psych., vol. 12, 1912, pp. 81-121.

33. DeMorgan, Augustus. Arithmetical Books from the Invention of Printing down to the Present Time. London, Taylor and Walton, 1847, 124 p.

34. —— ——. On the Study and Difficulties of Mathematics. Chicago, Open Court Pub. Co., 1898, 288 p.

35. Deuchler, G. Psychologische Vorfragen des ersten Rechenunterrichts. Zeits. f. päd. Psych., 1912, vol. 13, 36-52.

36. Dolbear, Katherine E. Precocious Children. Ped. Sem., vol. 19, no. 4, Dec., 1912, 461-491.

37. Dooley, W. H. Arithmetic in a Massachusetts Industrial School. School Sci. and Math., vol. 11, 1911, 246-249.

38. Dyer, F. B. Annual Report of The Superintendent. Boston, Dec. 15, 1913, 244 p.

39. Eliot, Chas. W. Shortening and Enriching the Grammar School Course. N. E. A. Rep., 1892, 617-620.

40. Erler, Otto. Zahlengedächtnis und Rechenfertigkeit. Zeit. f. päd. Psych., vol. 12, 1911,294-295.

40a. Freeman, F. N. Uber den Aufmerksamkeitsumfang u. die Zahlauffasung. Leipzig, Hahn, 1910, pp. 88-168.

41. Galton, Francis. Inquiries into Human Faculty and Development. London, Macmillan, 1883, 387 p.

42. Gartland, P. G. Two Experiments on Grammar School Graduates. School Sci. and Math., vol. 11, 1911, 155-159.

43. Gilbert, C. B. What Children Study and Why. Boston, Silver, Burdett and Co., 1913, 331 p.

44. Gildemeister, Thelda. Mathematics in the Elementary Schools of the United States. U. S. Bureau Ed. Bul., 1911, whole no. 460, 75-120.

45. Giles, J. T. The Scientific Study of Arithmetic Work in School. N. E. A. Rep., 1912, 488-492.

46. Gow, James. A Short History of Greek Mathematics. Cambridge, University Press, 1884, 323 p.

47. Greenwood, J. M. Verbatim Report of Recitations in Arithmetic and Language in the Schools of Kansas City, Mo., U. S. Com. Ed. Rep., 1893-4, vol. 1, 557-594.

48. —— ——. Report of the Committee of Fifteen—Dissent on Arithmetic. U. S. Com. Ed. Rep., 1893-4, vol. 1, 532-4; or N. E. A. Rep., 1895, 333.

49. —— and Martin, A. Notes on the History of American Textbooks on Arithmetic. U. S. Com. Ed. Rep., 1897-8, vol. 1, 789-868; 1898-9, vol. 1, 781-837.

50. Griggs, A. O. Pedagogy of Mathematics. Ped. Sem., vol. 19, 1912, 350-375.

51. Hall, F. H. and Gilbert, N. D. Imagination in Arithmetic. N. E. A. Rep., 1897, 621ff.

52. Hall, G. Stanley. Educational Problems, New York, Appleton, 1911, 2 vols., 1424 p. See "The Pedagogy of Elementary Mathematics," vol. 2, 341-396.

52a. —— ——. Adolescence. New York, Appletons, 1904, vol. 1, 589 p.

53. Harris, W. T. Report of the Committee of Fifteen. U. S. Com. Ed. Rep., 1893-4, vol. 1, 497-502; or N. E. A. Rep., 1895, 296-301.

54. Harrison, A. S. The Demonstration School Record No. 2. The Pursuits of the Fielden School, Manchester, Eng. University Press, 1913, 275 p.
55. Hart, W. W. Community Arithmetic for Seventh and Eighth Grades. Elementary School Teacher, vol. 11, 285-295.
56. —— ——. Mathematics in the Elementary Schools of the United States. U. S. Bureau Ed. Bul. No. 13, 1911, whole no. 460, 16-65.
57. Horn, Ernest. Experiment in Seventh Grade Arithmetic. Univ. of Mo., master's thesis, 1908. Typewritten, 69 p. with appendix. (Borrowed from Univ. of Mo. Library.)
58. Hornbrook, A. R. An Open Letter to Students Teaching Arithmetic in the Training Department. San Jose, Cal., 1913, 20 p.
59. Jackson, L. L. The Educational Significance of Sixteenth Century Arithmetic. New York, Teachers College, 1906, 232 p.
60. Jänicke, E. Geschichte der Methodik des Rechenunterrichts, vol. 3, Kehr's Geschichte, Gotha, Thiermann, 1888.
61. Jeffrey, G. R. Some Observations on the Use of the "Reckoning Tests." Jour. Exp. Ped., vol. 1, 1911-12, 392-396.
62. Josephus, Flavius. Antiquities of the Jews. Philadelphia, Porter, 1829, 978 p.
63. Judd, C. H. Studies in Principles of Education. Initiative, or the Discovery of Problems. Elementary School Teacher, vol. 13, 1912-3, 146ff.
64. Kikuchi, B. D. Japanese Education. London, Murray, 1909, 397 p.
65. Kirby, T. J. Practice in the Case of School Children. New York, Teachers College, 1913, 98 p.
66. Knilling, R. Die Naturgemässe Methode des Rechenunterrichts in der Deutschen Volksschule. Munich, Oldenbourg, 1897-9, 2 vols., 372 p. and 266 p.
67. Lay, W. A. Führer durch den ersten Rechenunterrichts naturegemässes Lehrverfahren gegründet auf psychologische Versuche und angeschlossen an die Entwicklungsgeschichte des Rechenunterrichts. Karlesruhe, Nemnich, 1898, 155 p.
68. —— and Enderlin, M. Führer durch das erste Schuljahre. Leipzig, Quelle, 1911, 434 p.
69. —— ——. Alte und Neue Experimente zum ersten Rechenunterricht. Zeits. f. exp. Päd., Bd. 1, 129-166.
70. Lessing, T. Pädagogik und Psychologie der Mathematik. Zeits. f. exp. Päd., Bd. 9, 225-237.
71. Lewis, E. O. Popular and Unpopular School Subjects. Jour. Exp. Ped., June, 1913, vol. 2, no. 2, 89-98.
72. Lietzmann, W. Stoff und Methode des Rechenunterrichts in Deutschland. Leipzig, Teubner, 1912, 107 p.
73. Lobsien, M. Korrelation zwischen Zahlengedächtnis und Rechenleistung. Zeits. f. exp. Päd., Bd. 12, 54-60.
74. Lucas, Edouard. Theorie des Nombres. Paris, Gauthier, 1891, 520 p.
74a. Máday, Stefan v. Die Fähigkeit des Rechnens beim Menschen und beim Tiere. Zeits. f. angewandte Psychol. u. psych. Sammelforschung, Bd. 8, Heft, 3 u. 4, pp. 204-227.
75. Major, D. R. First Steps in Mental Growth. New York, Macmillan, 1896, 360 p.

76. McLellan, J. A. and Dewey, John. The Psychology of Number. New York, Appleton, 1895, 309 p.
77. Mecker, H. H. A Study in Seventh Grade Subject Matter. Thesis, 1913, Univ. of Mo., typewritten, 84 p. (Borrowed from U. of Mo. Library.)
78. Messenger, J. F. The Perception of Number. New York, Macmillan, 1903, 44 p.
79. Meumann, Ernst. Vorlesungen zur Einführung in die Experimentelle Pädagogik und ihre Psychologischen Grundlagen. Leipzig, Englemann, 1907, 2 vols.
80. —— ——. Ueber die Anlage zum Rechnen. Zeits. f. exp. Päd., Jahr. 14, Feb., 1913, 117-118.
81. Mill, J. S. Demonstration and Necessary Truths. A System of Logic, bk. 2, ch. 6, New York, Longmans, 1900.
82. Millis, J. F. The Solution of Problems. Kansas School Mag., vol. 2, no. 9, Nov., 1913, 305-310.
83. Montessori, M. The Montessori Method. New York, Stokes, 1912, 377 p. See chap. 9, "Teaching of Numeration; Introduction to Arithmetic."
84. Münsterburg, Hugo. Psychology and the Teacher. New York, Appletons, 1909, 330 p.
85. Myers, C. S. Introduction to Experimental Psychology. Cambridge, Univ. Pr., 1911, 156 p.
86. Nanu, Helene A. Zur Psychologie der Zahlauffasung. Würzburg, Becker, 1904, 56 p.
87. Newcomb, Simon and Aley, R. J. The Teaching of Arithmetic. N. E. A. Rep., 1906, 86-102.
88. Paine, Cassie L. A Strong Motivation for Arithmetic Work. Elementary School Teacher, vol. 13, April, 1913, 379-386.
89. Palmer, G. W. The Teaching of Arithmetic in Secondary Schools. Great Britain Special Ed. Rep., vol. 26, 224-256.
90. Payne, B. R. Public Elementary School Curricula. New York, Silver, Burdett and Co., 1905, 200 p.
91. Perry, A. C. Problems of the Elementary School. New York, Appletons, 1910, 224 p.
92. Phelps, C. L. A Study of Errors in Tests in Adding Ability. Elementary School Teacher, vol. 16, no. 1, Sept., 1913, 29-39.
93. Phillips, F. M. Value of Daily Drill in Arithmetic. Jour. Ed. Psychol., vol. 4, no. 3, March, 1913, 159-163.
94. Phillips, D. E. The Genesis of Number Forms. Amer. Jour. Psychol., vol. 8, no. 4, July, 1897, 506-527.
95. —— ——. Number and its Application. Ped. Sem., vol. 5, no. 2, Oct., 1897, 221-281.
96. Preyer, W. The Mind of the Child. New York, Appletons, 1889, 317 p.
97. Ranschburg, P. Zur physiologischen und pathologischen Psychologie der elementaren Rechenarten. Zeits. f. exp. Päd., Bd. 7, 135-162, 1908; Bd. 9, 1909, 251-263.
98. Rice, J. M. Scientific Management in Education. New York, Publishers Printing Co., 1913, 282 p.
99. Rusk, R. R. Introduction to Experimental Education. London, Longmans, 1912, 303 p.
100. Santerre, S. Psychologie du Nombre et des Operations elementaire de L'Arithmetique. Paris, Doin, 1907. 178 p.
101. Scripture, E. W. Arithmetical Prodigies. Amer. Jour. Psychol., vol. 4, no. 1, also reprint, Worcester, Mass., 1891, 56 p.

101a. SCHANOFF, BOTJU. Die Vorgänge des Rechnens. Pädagogische Monographien, Bd. XI., Leipzig, 1911, 120 p.

102. SHAW, O. A. Arithmetic Philosophically Taught, or a Description of the Visible Numerator. Boston, Marvin, 1832, 95 p.

103. SMITH, A. C. The Teaching of Arithmetic. School Sci. and Math., June, 1912, vol. 12, 457-460.

104. SMITH, D. E. The Teaching of Elementary Mathematics. New York, Macmillan, 1901, 312 p.

105. —— ——. The Teaching of Arithmetic. Boston, Ginn and Co., 1913, 196 p.

106. —— ——. Early Drill in Arithmetic. Kansas School Mag., vol. 1, no. 3, March, 1912, 95-101.

107. —— ——. Article on "Arithmetic" in Monroe's Cyclopedia of Education. New York, Macmillan, 1911, 5 vols.; vol. 1, 203-207.

108. —— ——. The International Commission on the Teaching of Mathematics. Ed. Rev., vol. 45, January, 1913, 1-7.

109. —— ——. Sex in Mathematics. Ed. Rev., vol. 9, 1895, 84-88.

110. SONNENSCHEIN, A. The Study of Arithmetic in Elementary Schools. Great Britain Spec. Rep. on Ed. Subj., vol. 8, 1902, 571-585.

111. SMITH, W. H. All the Children of All the People. New York, Macmillan, 1912, 335 p.

112. SPENCER, H. J. The Teaching of Mathematics in the English Public Elementary Schools. Great Brit. Spec. Ed. Rep., vol. 26, 1912, 31-60.

113. STAMPER, A. W. A Text-book on the Teaching of Arithmetic. New York, American Book Company, 1913, 284 p.

114. STARCH, DANIEL. Transfer of Training in Arithmetical Operations. Jour. Ed. Psychol., vol. 2, 306-310.

115. STEPHENS, IRENE. The Teaching of Mathematics to Young Children. Great Brit. Sp. Ed. Rep., vol. 26, 1912, 61-79.

116. STITT, E. W. School and Business Arithmetic. N. E. A. Rep., 1900, 566-572.

117. STONE, C. W. Arithmetical Abilities and Some Factors Determining Them. New York, Teachers College, 1908, 102 p.

118. —— ——. Problems in the Scientific Study of Teaching Arithmetic. Jour. Ed. Psychol., January, 1913, vol. 4, no. 1, 1-16.

119. STONE, J. C. The Modernization of Arithmetic. N. E. Jour. Ed., vol. 78, Dec. 4, 1913, 573-578.

120. STRATTON, W. F. The New Thought in Arithmetic. Kansas School Mag., Dec., 1913, vol. 2, 336-7.

121. SULLY, JAMES. Studies of Childhood. New York, Appletons, 1896, 527 p.

122. SUZZALO, HENRY. The Teaching of Primary Arithmetic. Boston, Mifflin, 1911, 124 p.

123. TEAR, J. H. and COX, H. C. The New Arithmetic. N. E. A. Rep., 1897, 630-6.

124. THOMA, F. J. Lay's "Führer durch den Rechenunterrichts" und das Rechnen auf Grund der gegliederten Reihe. Zeits. f. exp. Päd., Bd. 11, 1910, 15-23.

125. THORNDIKE, E. L. Effect of Practice in the Case of a Purely Intellectual Function. Amer. Jour. Psychol., vol. 19, July, 1908, 374-384.

126. —— ——. Practice in the Case of Addition. Amer. Jour. Psychol., vol. 21, July, 1910, 483-6.

127. —— ——. The Measurement of Educational Products. School Rev., vol. 20, no. 5, May, 1912, 289-309.

128. —— ——. Educational Psychology, vol. 2. New York, Teachers College, 1913, 452 p. See chap. 7. "Amount, Rate and Limit of Improvement."

129. TROPFKE, J. Geschichte der Elementar-Mathematik in systematischen Darstellung. Erst. Bd.: Rechnen u. Algebra, Leipzig, Veit, 1902, 332 p.

130. VOIGT, W. Ueber die Anlage zum Rechnen. Arch. f. Päd., 2. teil, vol. 1, 1912, 129 ff.

131. WARK, ANNA L. Early Work in Number. Chap. in Education by Life, edited by Henrietta Brown Smith, London, Philip, 1912, 211 p.

132. WEBB, H. E. The Re-introduction of Arithmetic into the High School Course. School Sci. and Math., vol. 13, no. 6, June, 1913, 517-524.

133. WELLS, F. L. The Relation of Practice to Individual Differences. Amer. Jour. Psychol., vol. 23, no. 1, January, 1912, 75-88.

134. WHITLEY, M. T. An Empirical Study of Certain Tests for Individual Differences. Arch. of Psychol., no. 19, August, 1911, 146 p.

135. WILLIAMS, T. A. Intellectual Precocity. Ped Sem., vol. 18, March, 1911, 85-103.

136. WINCH, W. H. Mental Adaptation during the School Day as Measured by Arithmetical Reasoning. Jour. Ed. Psychol., Jan., 1913, vol. 4, no. 1, 17-28; Feb., 1913 ,vol. 4, no. 2, 71-84.

137. —— ——. Accuracy in School Children: Does Improvement in Numerical Accuracy "Transfer?" Jour. Ed. Psychol., vol. 1, 1910, 557-589; vol. 2, 1911, 262-271 and 334-336.

138. YOCUM, A. D. An Inquiry into the Teaching of Addition and Subtraction. Philadelphia, Avil Print. Co., 1901, 92 p.

139. —— ——. A First Step in Inductive Research into the Most Effective Methods of Teaching Mathematics. School Sci. and Math., vol. 13, no. 3, March, 1913, 197-210.

140. YOUNG, J. W. A. The Teaching of Mathematics. New York, Longmans, 1907, 351 p.

141. —— ——. The Fifth International Congress of Mathematicians. School Sci. and Math., vol. 12, 1912, 702-715.

A HEALTH EXAMINATION AT SCHOOL ENTRANCE

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In 1876 Dr. Clarence J. Blake of Boston presented a paper before the International Medical Congress at Philadelphia stating clearly and emphatically the needs of medical inspection of school children; but for nearly twenty years this wise recommendation was ignored, the health of school children was neglected, school diseases were uncontrolled, epidemics played havoc with school attendance, many children died from preventable causes, many more suffered from physical defects and unsanitary conditions. It was not until a series of epidemics had occurred in Boston that, finally, that city in 1894 established a regular system of medical inspection for the public schools. Slowly other cities followed until now nearly all of the large cities and many of the states require health inspection to a greater or less degree.

During the last five or six years the need for health inspection has been specially recognized, school nurses have been employed with excellent results in many cities, the need of caring for the teeth has been recognized, and dental clinics established, and the importance of mental hygiene and the hygiene of instruction is now being emphasized. In some places remarkable success has resulted from the methods of health inspection adopted. The excellent results of this movement have been clearly shown in the valuable resumé recently published by Drs. Gulick and Ayres (8), and the widespread interest was demonstrated at the International Congress on School Hygiene held in Buffalo last year.

The work, however, is still far from being adequate even in the cities where the best plans are in operation, and the inefficiency of the medical inspection in many places has given critics an opportunity to make serious charges against the whole plan. Many declare that no good has come from it, and that, in many cases, harm has resulted. Careful students of the subject like Dr. Gulick have noticed the serious defects and pointed out the need of more adequate provision for such inspection.

The feeling that any form of health inspection beyond the mere attempt to detect contagious disease is an infringement of individual and parental rights is widespread. It is well illustrated, I take it, by the recent action of Governor Blease of South Carolina in vetoing a bill for medical inspection of children attending public schools in Richland County. It is reported that the Governor expressed himself as follows: " Before I would sign such a bill I would resign and go off into eternal oblivion," and that he characterized such legislation as "outrageous, uncalled for, ill advised, and dictatorial."

The time has come when, if health inspection is to succeed, it must be carried farther and be made more adequate. The concrete methods by which this may be done can be devised by those actually engaged in the work; and more thoroughgoing and satisfactory methods should be adopted as far as local conditions will permit. One general need should be emphasized at the present time. If health inspection is to be fully successful in any community, the support of the general public and the coöperation of teachers and parents is necessary. One cannot expect the best results when teachers do not know that there are medical inspectors or when parents refuse to permit their children to be inspected. The next step in health inspection may well be an attempt to gain intelligent coöperation from parents and teachers.

The problem of gaining this coöperation is a difficult one and the process is likely to be a slow one. Teachers should have a different training, parents must be educated; but the beginning of such education, the writer believes, may well be made at the present time, and the method he would suggest is that of a thoroughgoing physical and mental examination of each pupil upon entering school life. This examination should be conducted by the health inspector with the aid of the teachers and one or both of the child's parents.

Such an examination of school beginners has been made with more or less thoroughness in Germany, but has not been common in this country. The plan of having the parents present at such an examination is not a new one. Both in Germany and in England the attempt is made to have the parent or guardian attend the examination. The need of the coöperation of parents is recognized in these countries, and the aim is to gain their sympathy and assistance by this method. The memorandum of the British Board of Education states the purpose as follows:

" Nor must the influence which the parent can exercise by example and precept be neglected. One of the objects of the new legislation is to stimulate a sense of duty in matters affecting health in the homes of the people, to enlist the best services and interests of the parents, and to educate their sense of responsibility for the personal hygiene of their children. The increased work undertaken by the State for the individual will mean that the parents have not to do less for themselves and their children, but more" (8, pp. 75-76).

The need and the advantages of such an examination and the plan and scope of it will be explained in detail presently, but before considering this let us note the biology and the usual chronological and physiological age of the school beginner.

Pre-school Life and the School Beginner

Dr. Thiele (15) has attempted a biological study of school beginners. He began with this question: are the children who begin school at the age of six affected by definite influences connected with the family, heredity, diseases, and the like? His investigation shows the distinct importance of studying such conditions, and that these are significant for judging of the physiological and psychological age of the pupils. If we wish to determine the influence of the school upon the child we must know the condition of the raw material. This he attempted to determine.

His investigation concerned 5,538 children in the People's schools of Chemnitz and was based upon the answers to a questionnaire sent to the parents of the children. This investigation concerned twenty points relating to the family and to the child, and included among others the following questions: Are both parents living? How many children in the family? Was the child educated by one parent, or both, or with the help of other persons? and questions relating to the birth of the child, age of learning to walk and speak, and to conditions of health, contagious diseases, accidents, hearing, vision, etc.

The importance of these family conditions is strikingly shown by the statistics obtained in regard to the number of members in the family. 16.81% of the boys and 23.27% of the girls were only children. 26.05% of the boys and 11,21% of the girls had more than six brothers and sisters. That is, probably in many of these cases the child was the youngest child of the family. The significance of being an only child has been emphatically shown by the investigation made by Dr. Bohannon in Clark University and the study made by Neter in Germany. Dr. Thiele finds that this is an important condition also in relation to disease. In general the only child has been better protected from contagious diseases. For example, only 58.94% of these boys had had measles, as compared with 64.46% of the children in general; and 57.58% of the girls had had measles as compared with 66.75½ in general. The only children also were more frequently well nourished than others. Conditions of nutrition were satisfactory in case of 99.24% of these boys as compared with 97.66% in general, and 99.39% of the girls were in satisfactory condition of nutrition as compared with 97.96% in general.

A peculiar fact, or at all events, the suggestion of a peculiar fact was brought out by these investigations. The only children in many cases learned to walk more quickly than the others. In fact 72.52% of the boys learned to walk before the first year as compared with 62.34% in general, and 74.24½% of the girls as against 44.80% in general. They learned to talk earlier also apparently; at least 31.18% of the boys learned to speak before the end of the first year as against 22.07% in general; and 37.88% of the girls learned to talk before the end of the first year as against 25.84% in general.

We see from these results that the only child in the family is better protected from contagious diseases than other children, as we might naturally suppose would be the case. Again on the other hand the only child in the family is more likely to be precocious in his development. This again we might naturally infer because such children usually receive more attention from their parents and probably are often over stimulated. Such precocity in learning to walk and to speak, and the like, is looked upon with grave suspicion from the point of view of hygiene.

The large percentage of the children who already had had the common contagious diseases shows the advantage of not having children enter school before the age of six, and would indicate that by this time the majority of children in Chemnitz are protected against measles but not protected against other school diseases. Thiele's results are probably typical for many urban communities.

Age and Development on Entering School

The problem when the child should enter school is one which should be considered from many points of view. The primary considerations are two. First, the physiological age of the child; the significance of this has been shown very emphatically by Dr. Beik (5). One can see from his paper what the normal physiological age for school entrance should be. The other important consideration is the relation of the home to the school. Frequently the condition of the home is such that a child may be better off to attend school even if not properly developed for school life.

Even from purely pedagogical considerations there seems to be no evidence that it is an advantage for pupils to enter school at an early age. Mr. Winch (16) has made an extended study of this problem in a number of English schools, and his results indicate that there is little if any gain in having children in that country enter school before the age of five or six.

Among the conclusions that Mr. Winch deems fully established by his facts are the following:

> 1. "That from the entrance age of three to five, early entrance confers no intellectual advantage on the child, either in his infant school work or in his subsequent progress in later school life."
>
> 2. "That there is some reason to suppose that children who enter after five years of age show some retardation in subsequent school progress. . . . But I am fully conscious that these children who enter after five are "selected" children. Some are weak in health, some come from very good homes and have had a good deal of instruction at home, and some have been *driven* into school by the compulsory attendance officials."
>
> 3. "That these conclusions are quite independent of the particular form of teaching adopted."
>
> 6. "That no advantage appears to exist in early entry so far as the subsequent attainment or good behavior and the development of attentiveness are concerned."

If, as at present is the case, we admit children at a given chronological age, then, as seems to be shown by these studies of Winch, from a pedagogical point of view there is no appreciable advantage in having children enter before the age of five or six. On the other hand the investigations by Ayres indicate that it is desirable that children should enter at the age of six or at least at the age of seven.

In one study made by Ayres (3) in 1909, the complete school records of all children in the graduating classes throughout the entire city in June of that year were available, 16,000 in all, and the investigation covered their complete school records. Only the records of children who had entered the first grade and completed the eighth grade were tabulated, a total of 11,185 cases. The ages at beginning varied from five to twelve years, and the time for completing the course ranged from 5½ to 13½ years. The investigation clearly showed that children entering school at advanced ages made more rapid progress than those beginning earlier, but that the difference was slight.

Dr. Ayres made a study also of the records of 13,867 children in 29 other cities, and he divided these records into three progress groups in which those who had taken more than eight years to complete the eight grades were termed slow; those who had taken just eight years, normal; those less than eight years, rapid. The results of this tabulation are shown in the following table.

PROGRESS CLASSIFICATION OF 13,867 CHILDREN IN THE EIGHTH GRADES OF 29 CITIES, ACCORDING TO PER CENT RAPID, NORMAL, AND SLOW IN EACH ENTERING AGE GROUP

Age At Entering	Per Cent Rapid	Per Cent Normal	Per Cent Slow
5	10	58	32
6	27	52	21
7	40	45	15
8	59	33	8
9	81	17	2
10	98	2	—
11	100	—	—
12	100	—	—
13	100	—	—
14	100	—	—

These results raise the following problem as Dr. Ayres points out. "Is the best entering age the one which results in the greatest proportion of rapid pupils, the smallest proportion of slow pupils, the largest proportion of normal pupils, or the most equal balance between the three groups?" His opinion is that "the best entering age is the one that results in a large proportion of normal pupils combined with most equal balance between the rapid and slow groups."

The general result of his investigation he summarizes as follows:

1. "The results of these three studies of the school histories of more than 25,000 school children who have completed the elementary course indicate that children entering at advanced ages subsequently make more rapid progress than those who enter younger."
2. "The subsequent progress of children entering at the more advanced ages is slightly more rapid than that of those entering at the lower ages, but it is not sufficient to enable the child to overtake in the school course the child who entered younger."
3. "The entering age of six is the one which makes the best showing with respect to resulting in a large proportion of the children making normal progress and a nearly even balance between the rapid and slow groups."
4. "The entering age of six is the one which makes the best showing with respect to resulting in the largest proportion of the children finishing the course at normal age and a nearly even balance between the under-age and the over-age groups."
5. "The entering age of six furnishes the most homogeneous group, judged on the basis of subsequent progress."

Of course in interpreting such results it should be remembered that as our schools are organized in most places it is not easy for a child who enters at a late age to be promoted more rapidly than the class, even if distinctly better progress is made. And frequently a child who has never been in the school is placed in the first grade, when it could well do the work of the second or perhaps even the third grade. And, finally, it is not a question of mere progress, but a question of psychological development and of hygiene.

The custom of this country and in several countries in Europe is to have the child begin school at the end of the sixth year of life. Dr. Steinhaus (12) as a result of his investigation maintains that the completed sixth year represents the most favorable age for entering school, the one best adapted to the physical and mental development of the child. While probably most children at this age have the physiological and mental development necessary for doing work of the school without injury to health, many others have not yet attained suitable development. Consequently it is desirable to consider physiological and psychological age rather than chronological age. Let us note the more obvious signs of the stage of development the normal child is likely to have attained at the age of six.

According to the investigations of Camerer, Monti, Lange, Gundobin, and others, the majority of boys at the completion of the sixth year have attained a height of 110 cm., and the rate of growth in the sixth year is 5 cm. A boy of 7 years of age usually has attained the height of 115 cm., and the rate of growth for that year is 5 cm. In the case of girls the numbers are on an average 1 cm. smaller. Also the measurements of children on entering school in different cities have given similar results. Among the children measured by Quirsfeld, for example, the smallest height for the children completing the sixth year was 98 cm., and the greatest, 127 cm. One-third of the pupils had a height between 109–113 cm.; a few, 2.5%, had a height of over 120 cm.; and a considerable percentage, namely, 3.5%, had a body height of less than 110 cm.

In the second place, as regards body weight. The weight of children entering school, according to investigations of Quirsfeld, varied between 12 and 27 kg. 75.4% of the children showed a mean body weight of 19.5 kg. Stephani among the Mannheim children on entering school found the following averages. In the year 1906, for boys 19.46 kg., for girls 18.82 kg.; in the year 1907, boys 19.79 kg., girls 18.88 kg.; 1911, boys 20.10 kg., girls 19.30 kg. The minimal weight with the boys in 1907 was 14.35, among the girls 12.56 kg. The average on entering school after the completed sixth year, according to the figures found by different investigators, is for boys about 19 kg., for girls about 18 kg.

Some maintain that the circumference of the head is also a significant measurement. Gundobin found at the age of five with boys the average circumference 50.1 cm., with girls the same. At the age of six for boys, the average is 50.8, for girls 49.4. Monti found an average circumference of 51 cm.

The figures represent fairly well probably the gross physiological development of German children in the Peoples Schools. On the basis of these Dr. Steinhaus makes the following demands: The height of children on entering school should be at least 110 cm., the weight 18.20 kg., the chest circumference 52–54 cm., the head circumference 49.5 to 50.5 cm. at the end of the completed sixth year. A child that has this development can be admitted to the institution without hesitation, according to him. And in his opinion there are no serious objections to admitting a child whose height is only 108 cm.

The social environment of children is an important factor in determining their development, and so in Germany, where different classes of children attend different schools, most of the children attending the People's Schools, some the middle schools, and others the higher schools, it appears that a different standard is necessary for the different schools. Dr. Selter points out that children entering the Gymnasium are from 4 to 6 cm. taller than children entering the People's Schools. Hence he suggests, as minimal standards of height 110 cm. for those entering the Peoples Schools, 113 cm. for those entering the middle schools, and a still higher figure for those entering the secondary schools.

There seems to be a pretty general consensus from the medical point of view that children should not attend school before the completed sixth year, and that children who are imperfectly developed, the weak or diseased, should be excused from entering school at that time.

From the point of view of hygiene only those children are fitted to enter school who have that degree of strength and development that makes them capable of standing the confinement of the school and performing its duties without injury to health. The bearing of our present knowledge of development on the usual and suitable physiological age at school entrance has been shown in the excellent paper by Dr. Beik. It should be that of the normal child at the age of perhaps six and one-half years.

Even among children of the same social status there are wide individual variations. Thus it is necessary that studies of different types of children should be made and standards determined for the physiological age of these different types. Until a thoroughgoing study of the biology of the school beginner in this country has been made and such standards determined, we must use merely rough, and ready methods corrected by general observation. Perhaps the following will serve as minima for children in this country.

1. The height should be at least 115 cm.
2. The weight should be at least 20 kg.
3. The circumference of the chest should be at least 53 cm.
4. The child on entering school should have all four of the sixth year molars.

The standards should be much the same at this age both for boys and for girls, although for girls a little less than these standards as regards height and weight may be permitted. Again in the case of children who clearly belong to a smaller type physically exceptions should be made to these norms. In both sexes and for all types the presence of all four of the sixth year molars should be required.

Scope of the Examination

The suggestions of the German physicians in regard to school entrance are excellent, but in my opinion we should go much farther than this. The following things seem desirable.

There should be a physical examination participated in by the teachers and parents as well as by the school physician, and this examination should include the following things: 1, a test of physiological age; 2, a test of psychological age; 3, a test of the general health condition; 4, a history of the morbidity of the individual child.

The test of physiological age may at first be confined to the things already mentioned; but probably in the near future, after further studies of the biology of the school beginner have been made, it will be possible to note other important conditions and determine more accurately the stage of physiological development. X-Ray photographs showing the development of the epiphyses of the bones, tests of the range of the voice, of the development of the eye, and other organs, may probably be included.

2. The tests of psychological age will at first be along the line of the Binet and Simon tests supplemented by other tests, especially perhaps of motor ability and the ability to form practical judgments in new situations, and these controlled by the results of observation by parents, teachers, and physicians.

In the tests of psychological age also, attention may well be given to the habits of observation, of attention, association, and the like, calling the attention of both parents and teachers to habits as of fundamental importance. This psychological examination should include the determination as far as possible of the mental type to which the individual belongs. Probably less can be accomplished in the way of determination of the child's type of imagery than many psychologists have supposed; but still more important than this is probably the determination of the learning type. Although no adequate experimental studies have been made, so far as I am aware, observation seems to show pretty clearly that there are two marked types of learners, one type which learns easily by instruction, by hearing and seeing what others do, and from definite directions and demonstration; that is, a type which learns easily by the usual didactic methods of the school. On the other hand, another type which learnes chiefly by doing, and this by one's own method. The ordinary methods of the school, however, are usually adapted to the child that learns by hearing, by instruction; and the individual of the doing type is at a great advantage and often appears dull. It is of the utmost importance that these two types be distinguished as early in school life as possible, and the beginning of diagnosis should be at the entrance of school life.

Which of these two types is the better we need not discuss, but the work of the school clearly gives an advantage to the child that learns by hearing and seeing, that learns by instruction; and such children are likely to succeed in school work as the school counts success. On the other hand, children who belong to the doing type are likely to learn more thoroughly what they do learn, they perhaps more often acquire the habit of independent thinking, they are not handicapped by conventional methods and conventional ideas, and are more likely probably to do original work and to add to the sum of human knowledge by invention or scientific or artistic production. It would be better probably if the work of the school were more adapted to this latter type; for even the other type would probably be benefited by having more training by actual doing. That, however, is another story not to be told here.

The test for psychological age can be carried much farther and be made much more adequate when more careful investigations have been made bearing upon this subject; for example, after the promising investigations by Krasnagorski and others by Pawlow's methods have been perfected, it will be desirable probably to make tests of the conditioned reflexes, memory reflexes, and the like. Tests of association, of the various learning types, of voluntary action, inhibition, and of mental attitudes, may all be ultimately included.

3. The test of the health condition should be primarily to determine the general physiological condition, and also more concretely the condition of the teeth, the throat and the nasopharynx, specially noting the condition of the tonsils, the

presence or absence of adenoids, the occlusion of the teeth, the condition of the eyes, ears, and so on.

4. The morbidity history as far as possible of all diseases that the child has had should be recorded, and especially should be noted whether the child has had rickets, scrofula or any form of tuberculosis, convulsions, measles, scarlet fever, whooping cough, diphtheria, chicken pox, mumps, etc., etc.; and such a record for each child should be kept in the school or by the medical inspector or board of health.

This morbidity test should include also a very careful noting of bad habits, not only habits obviously detrimental to health, biting the finger nails, sucking the lips, placing the tongue in abnormal position and other habits that tend to produce dental defects, but also any bad habits as regards cleanliness, chewing the food, digestion, excretion, and bad habits of attention, association, and the like.

Significance of the Examination

The entrance on school life presents an opportunity for hygiene that has been strangely neglected. An examination of school beginners as regards physiological development and general physical condition has vast possibilities. It gives opportunity not only to determine whether a child is in condition to do the school work without injury to health, but also to educate the parents; and further it gives opportunity to have the child put as far as possible into good physical condition. We have already recognized the right of the State in matters pertaining to health. We insist, for example, that a child shall be vaccinated before entering school. We insist that a child shall not come to school with a contagious disease. There is a feeling, however, on the part of many, that to go beyond this is an interference with individual rights and the prerogatives of the home. This is a survival of the old idea that the function of hygiene is negative. With the new view of the positive function of hygiene, there seems to be equally good reason for requiring such a condition of health and development as will enable the pupil to do the work of the school efficiently and without injury to health.

A thoroughgoing examination should be made at the beginning of school life. Plenty of time should be given for this, and it should be in the nature of a consultation of experts. The school physician should be, not only a medical expert, but also an expert in school hygiene. The teacher, if with some professional training, is to some extent an expert in school work. The parents having watched and trained their own children are in a certain sense experts in regard to them.

Here in this problem of school entrance is to be found, if not the key, at least the strategic point of attack, for many of the pressing practical problems of school education to-day. Such a thoroughgoing examination conducted by the school physician, parents, and teacher, would be of great value pedagogically as well as hygienically.

For example, it is pointed out by the wise that a better coöperation between the home and the school is necessary. Here is the place to begin coöperation. In a tactful examination such as that mentioned, if made by fairly intelligent school physicians and teachers, coöperation of parents could be gained in a natural way. By consulting the parents in this examination in regard to the peculiarities of their child, the diseases the child has had, and his general condition of health, the expert character of the parent would be recognized and an attitude of coöperation would be easily aroused.

This problem is of fundamental importance because it is only by coöperation of the home and the school that we can satisfactorily solve the problems of adapting school work to the capacities of the children, of proper care for their health, and of vocational guidance.

The evil of the present lack of coöperation between the home and the school has been often pointed out, and it is illustrated by the attitude of teachers as well as that of parents. When a subject like overpressure, for example, is discussed, we teachers are apt to say that the conditions in the home are responsible; that it is the work children do before coming to school, and the dissipation of the home, not the work of the school, that causes overpressure. The home, not the school, is to blame,—as if that settled anything. When there is illness or inefficiency among school children; again it is the home we blame; conditions are more hygienic in the school than at home. Such shifting of responsibility is easy; and all this is largely true. But reflect for a moment on a very obvious truth. Most of these parents a few years ago were pupils in the schools. In twenty-five years children entering school now will be the parents.

Again we say the parents need to be educated. This is the burden of much of the pedagogical literature of today. We cannot solve the problems of the school until the parents are better educated is the common lamentation; true enough, but how shall we begin to educate them? A better way could hardly be devised than an entrance examination for the children in which the parents could participate. Such an examination would educate the parents not merely because physician and teacher would have opportunity to give advice; but far more because parents would learn by means of it that school work is not an occupation to be taken up lightly and dropped again when something lucrative is offered for the children, but a serious matter requiring health, and a degree of physical and mental development. Entrance on school life is too easy. Parents would prize the opportunities and privileges of the school more if it were harder to obtain them. Thus the time and inconvenience required for the examination would be a distinct advantage because an important means of educating the parents.

One great cause of the inefficiency in school work and the lack of adaptation of school occupations to individual capacity and health, is the fact that we do not begin right. An examination like that described would be a good beginning; it would go far toward developing the right attitude in parents toward the school; it would acquaint the teacher with important facts in regard to the character and home conditions of the pupils; it would give the physician important facts in regard to earlier development and the morbidity history of the pupils; and after more biological studies of the school beginner have been made, it would enable the physician and teacher to determine both the physiological type and the learning type to which the individual child belongs. And, finally, it would change the attitude of the teacher toward the parents; in many cases give them a wholesome respect for the expert character of the parents as regards their own children, and make it far easier for both parents and teachers to coöperate.

Another great problem is that of retardation. Among the causes of retardation recognized by Professor Strayer (13), in his article on this subject in Monroe's Cyclopedia of Education, are: " Illness extending over a long period, backwardness or mental deficiency, the lack of a school course adjusted to the needs of varying abilities." The difficulties mentioned by Dr. Strayer,—illness, mental deficiency, an ill-adjusted school course—should be attacked at the outset in the light of a thorough study of the raw material when brought to the school. Again the money cost due to the repeaters has often been pointed out. The estimates of this have perhaps been exaggerated, but the cost in any case is enormous and the waste of time and energy great. A large part of this could be saved by admission tests and by proper grading, and the saving of money would probably more than make up for the added expense of this examination.

One of the reasons for retardation is the fact that children enter school prematurely or in such imperfect physical or mental condition that they cannot do the work of the school. Failure occurs from the first, and the pupil handicapped both physically and mentally is turned back at the close of the year to repeat the same dreary routine. The place to begin the prevention of retardation is at the entrance of school life.

The next great educational problem concerns the elimination of pupils. Why do pupils drop out of school before their course is completed? It is usually because they do not succeed in school work, or because they are more interested in something else, or because the parents do not coöperate with the teacher in trying to keep them in the school. An admission examination of the thoroughgoing kind mentioned would not only prevent those who cannot succeed in school work from entering, and make better adjustment possible, thus averting many heartbreaking failures among the pupils, and much futile worry and effort among the teachers; but, as already suggested, if it were harder to enter the school, parents would not esteem its privileges so lightly nor be so ready to let their children leave it.

Again take the group of problems included under the word efficiency. During the last few years this has become a word to conjure with. The term is more or less abhorent to the scientist, because, on the one hand, it often stands for a superficial view of the great problems of life and work; on the other, because many of the principles of this new science of business and industry were worked out twenty-five years ago by Mosso and others in the laboratory, and then ignored because business was ignorant of science. But the problems involved are of vital importance; and it is well that they have been put in the terms of the shop and the counting room and thus made to appeal to those who have a business apperception.

What, however, could be more inefficient than our present haphazard method of beginning school work without determining whether pupils are fit for school occupations or not? Why should the public money be spent in trying to teach those who can profit little by instruction or who are likely to be injured by it. The teachers are also handicapped by the presence of such children, and it largely thwarts the purpose of school education. From the point of view of common sense, and efficiency, let alone hygiene, is there any good reason, any justification for admitting children to school work in the present haphazard fashion and in neglecting to give such an examination at the beginning of school life? Admission of the deficient should be postponed or they should be placed in special classes.

Another great problem of the school is the problem of grading. It is obvious if children were tested at the beginning of school life, if the different working types were distinguished, and if the feebleminded were excluded, it would be far easier later on to solve the problem of grading. Many of the difficulties of this great problem would be removed by such an examination, and the right beginning would save a considerable number of repeaters in the early grades.

Most important of all perhaps is the problem of obtaining the right attitude between pupil and teacher. A thorough examination of the children at the outset would help much toward ensuring this. The teacher would learn the handicaps of defective vision, defective teeth, chronic disease, unfavorable home conditions, and the like. Such an examination would be of great advantage to teachers also in another way. The great mistake still found almost everywhere is that of giving attention to the subject to be taught rather than the child to be educated, the subject of culture rather than the object of culture. An examination of this sort would at the outset call the attention of teachers to the needs of individual pupils, and the advantage to teachers might be as great perhaps as to the parents.

Educators now are beginning to recognize that the knowledge acquired in the school amounts to relatively little, but the habits formed and the attitudes toward life and society and work that are carried away from the school are of vital importance. A circular issued to the State inspectors of schools by the State Superintendent in Wisconsin calls attention to this fact, and this is coming to be the keynote of the exhortations to teachers. If, then, this be the aim, what could be more important than to start school work aright and to have the right attitude toward the school developed at the outset in the minds of parents and teachers on the one hand, and the right attitude in the mind of the teacher toward the pupil on the other hand.

Such an examination will seem of course Utopian; but practical school hygiene no longer fears this charge. The difficulties connected with such a plan are likewise great. One objection that will be urged is the fact that so much time and expense would be required to make such examinations. Of course it is all a question of relative values; but if, as is probable, the whole scholastic career of the child is likely to be influenced by the way it begins school work, and if the attitude of parents and teachers is to be determined largely by such an examination, and if the school work for the early years at least will be made far more efficient by having it, and if, finally, the parents are likely to be educated by such an examination to better coöperation and greater interest in the school, how could the time be better spent? It would be an excellent thing in most cases if both parents were required to give up half a day for such an examination with provision of course that in case of special need one parent might be excused. Nothing probably would do so much to make the parents interested in the work of the school, to make them prize its opportunities, to make them coöperate with the teachers and to make them give more intelligent attention to the physical welfare and health conditions of their own children.

That the attitude of parents toward the school, toward an examination of this kind, and toward special instruction for peculiar or defective children can be changed, has been shown by the experience of the Child Study Bureau and social workers in Chicago. Jane Addams (1) has given interesting illustrations, and her paper given a few years ago before the Department of Special Education of the N. E. A. is so excellent that I quote from it at length:

> "When deficient children are discovered in their homes, are taken care of by trained teachers, after they have been diagnosed by child-study departments, and when all the apparatus of public education is turned on, the parent is convinced that his child is not an exception. When the parent is besought to aid in this process of special education, then he first loses his peculiar sensitiveness in regard to his child. The reaction of this change of attitude upon the entire family is something astounding. I think it was Father Huntington who once said that the essence of immorality is to make an exception of one's self, and certainly the essence of self-pity is the conviction that one is so isolated. Comradeship dispels self-pity as the sun dries up dampness. You think you have a child unlike other children; you are anxious that your neighbor shall not find it out; it makes you secretive; it makes you singularly sensitive; it places you and the normal children in the family in a curious relation to the rest of the community; but if you find out that there are many other such children in your city and in other cities throughout the United States, and that a whole concourse of people are studying to help these children, considering them not at all queer and outrageous, but simply a type of child which occurs from time to time and which can be enormously helped, you come out of that peculiarly sensitive attitude and the whole family is lifted with you into a surprising degree of hopefulness and normality. I could illustrate this with many tales. This reaction of the schools for special children upon the home may bring back into the school some of that early devotion to them which we are in danger of losing.
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> "During the period of detention every child is subject to the medical treatment which he specially needs; he is put into a school. . . . The results are simply amazing. Sometimes one actually fails to recognize a boy after he has been in this school a short time, such is the result of good food, of baths and all the rest of the things which Mr. Brockway years ago proved efficacious. After he had been subjected to this treatment for a month or six weeks his own parents subtly change in their attitude to him. The mother recognizes that which she always knew was there, although she had no power to bring it out; and the father, who was said not to be fond of him, suddenly swells with a new sense of pride. The onlooker wonders why this hasn't been done before the child was arrested, before he had to be brought to this preliminary disgrace."

> "I have seen an Italian family change their entire attitude toward a crippled child who was taught to carve wood with his one hand so well that he earned a very fair wage in a furniture factory. . . . To bring the home and the school into closer connection through these special children affords a glorious educational opportunity, and the results may react upon the schools in a way we can, as yet, scarcely estimate."

It frequently becomes necessary on account of the ignorance and poverty in many homes for the school to assume functions that do not belong to it. It may well be maintained, for example, that it is not the function of the school to bathe children nor to clean their teeth; but it often becomes necessary for the school to assume such duties. In all such cases, however, the principle should be for the school to assume them in such a way that it will not be permanently necessary. The parents should be so educated that after a time they will assume the functions that really belong to the home, and in any case the training should be such that when the pupils that are in the schools today become the parents of the next generation they will be competent and willing to perform the duties that really belong to the home. Education of the parents of today would be greatly furthered by their presence in this admission examination.

Again it would tend to give teachers the right attitude toward the home and toward children. Teachers should always recognize the authority, the responsibility, and the general expert character of the parents in the education of their own children. The numerous exceptions to this can be treated all the better by one who recognizes this general truth. On the whole, perhaps we may say that parents are not much more inefficient than we teachers, and certainly we can learn much from a child's parents in regard to the best methods for his education.

Again such a plan is likely to make not only the work of the teacher easier, but to make it far easier for the medical inspector to do his work without interference from the parents and to make the school nurse a welcome visitor in the homes. Such a plan with a suitable system of medical inspection and with school nurses would also make it far easier to control contagious diseases. The interests of general hygiene as well as of school hygiene would be greatly furthered. The medical inspector in turn will lose nothing by recognizing the general expert character of parents in regard to their own children.

Many things of vital importance in connection with the development of children are likely to be known only by the parents and would be gladly contributed by them in such an examination. For example, children who are born prematurely are apt to have a precocious development, as might be supposed. The premature stimulation from the external world hastens the medulation of the nerves, and I understand that observation shows that in later years such children are more liable to certain disorders and are less able to do the work of the school. Such a fact is of vital significance for adapting the work of the school to the individual, and parents alone are able to give this information.

The work of medical inspection cannot be carried out satisfactorily without the intelligent coöperation of parents. The difficulties found by the inspectors in performing their duties in health inspection illustrate this concretely. Dr. Arnold (2) of Boston has reported cases in the early years of medical inspection in that city, among them the following:

> "Four cases were sent home with suspicious-looking throats. With each child was sent a note stating that there had been some cases of diphtheria in the schoolroom, that the child had a sore throat that probably was diphtheria, and that the school inspector advised calling the family physician. The doctor was not called in a single case. The mother of one of the children brought him back herself in the afternoon, and was abusive to the teacher for sending him home. I turned up just in season to get my share. I was informed that I did not know what I was talking about; that his nausea and vomiting and constitutional symptoms two days before were due to indiscretion in eating; that his sore throat was "simply tonsilitis," that he was subject to, and that the patches in the throat were of no importance. The other children might have diphtheria, but her boy didn't "because he wasn't sick enough." She refused to let me take a culture, and was informed that the boy would not be admitted to the school until a negative culture had been obtained by myself, or, if she preferred, by her family physician. She did not go to the family physician until another week had elapsed, when a culture proved negative. I feel reasonably sure, however, that an earlier culture would have been positive.
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> "The three other cases returned next morning. Two brought verbal messages that they were well enough to come to school. The third brought a note from his father, saying that it was absurd to say his boy had diphtheria. Cultures were taken from all three throats, and all proved positive. The mother of one of these was not convinced even then. She called another doctor to prove that the school doctor was wrong, and discharged him when he obtained a positive culture, and she was only partially persuaded there was no trick to it when a third doctor also found a positive reply to his culture."

A Health Year For Beginners

Health inspection comprises two things: first, limited medical inspection for detecting and controlling contagious diseases; and second, physical and mental examinations to determine the stage of a pupil's development, physical defects, non-contagious diseases, and the like. There is a growing consensus of opinion that while the former may be placed under the control of the Board of Health, the latter should be under the control of the educational authorities, or at least conducted with their full coöperation. In any case there should be concentration of authority and responsibility in the hands of competent experts, and adequate records should be kept.

The latter form of health inspection should be made much more thoroughgoing than is now customary. The results of recent investigations in child hygiene indicate that the aim and character of elementary education should be revolutionized and the emphasis placed especially on health, normal development, spontaneous motor activities, plays, voice drill, and the like; that if the work of the school is to be done successfully in later years special care should be taken at this period to put the child's physical organism in the best condition possible for healthful development. This is the time to care for the development of the vital organs of the body, to protect the sense organs, and to develop habits of healthful activity in the widest sense.

If the hygienist could have his way the first year of school life, or perhaps the first two years, would be a *Vorschule,* in which the teachers would be physicians and hygienists; and the aim for this year would be to determine the child's stage of development, his physical resources, his physical defects, and so on, and as far as possible to remedy these defects and to foster normal development by ample opportunity for play and other forms of spontaneous motor activity.

Note what happens at that great epoch in life when a child enters school. There is a great change in environment. The freedom of the home and of the street must be given up for the restraint of the schoolroom. Customary stimuli are replaced by new ones. Customary reactions must be inhibited and new forms of response acquired. In general, an attempt is made to develop the power of inhibition and of voluntary attention. As a result the first year is apt to be a trying one. In Germany this has been indicated by several studies. The need of a special examination at school entrance and of special hygienic care during the first year of school life in that country has been strongly emphasized by the results of several investigations which show the work of the first school year correlated with a decrease in the rate of growth and an increase in the amount of disease. Dr. Schmidt-Monnard (11, p. 362), for example, as a result of investigations carried on for years in Halle, found that with the beginning of school life there was a decrease in the rate of physical growth. According to his studies carried out on the same children the yearly increase in weight for those who had not yet entered school was, for the years 6 to 7, 2.2 kg. for the boys, 1.9 kg. for the girls. The rate of increase in height was 7.4 cm. for the boys, 5.4 cm. for the girls. On the other hand in the case of children of the same age who had already entered school the yearly increase in weight for the year 6 to 7 was for the boys only 1.5 kg.; for the girls 0.6 kg., and the increase in height for the boys 4.2 cm., for the girls 4.5 cm. Thus the increase both in height and weight was less in the case of both boys and girls who were in the school than in case of the boys and girls of the same age who were not in school.

Hertel, in Copenhagen, where the children entered school at the age of seven, found a considerable increase in the morbidity of the children in the 7th school year; that is, in the period after school entrance, and a decidedly marked minimum of disease in the sixth to the seventh year, that is, the year before school entrance. In Halle, on the other hand, where the children entered school a year earlier, this year, 6 to 7, was the time of an increase of the morbidity.

Dr. Quirsfeld (11, p. 363) also studied the effect of the first school year on 1,014 school children. According to him the average increase in growth in the first school year was 2.5 cm., in each succeeding school year 5 cm. The average increase in weight in the first school year was only ½-1kg., in the second school year 1–2 kg. He found also in the course of the first school year a decrease in weight in case of 15.87% of the boys and 24.84% of the girls; a standstill in weight in the case of 29.73% of the boys and 44% for the girls; he found also in the course of the first school year a decrease in muscular development in the case of 29.59% of the boys and 49.05% in the case of the girls.

As Dr. Quirsfeld remarks, it is difficult to give the cause of this; whether the seventh year of life is the period of weakest physical development it is difficult to say. As a control it would be necessary to have a sufficiently large number of children of the same age, who during the seventh year of life were out of school, living a free life as heretofore. Injurious influences, mental overstrain, fatigue, insufficient sleep—in modern schools and with modern methods of instruction—can hardly, except in individual cases, be alleged as possible causes for arrest in physical development. The causes may be exclusively individual constitution and changed conditions of life.

Until we have such a preparatory year devoted to health and development, the problem of what should be done with those children who would be excluded from school by such an entrance examination is an important one. In Bonn and other cities in Germany where an entrance examination of more or less thoroughness is made, the children excluded because of lack of physical development are usually placed in a kindergarten. Such a plan modified to suit local conditions, especially if the kindergarten has largely out-door occupations, seems an excellent one.

SUMMARY

The reasons for a thoroughgoing health examination like that described above are obvious. Such an examination is desirable:

1. To prevent those children who are in ill health or not sufficiently developed physically and mentally from entering.
2. To provide the necessary physical data to enable teachers so to order the school work that it will not result in injury to health or a check to development, as often happens in the first year of school life.
3. That proper grading and adaptation of school occupations to individual capacity may begin at the outset of school life.
4. To give school physicians the data necessary for safeguarding the health of children against contagious diseases and the like.
5. To give teachers proper knowledge of the new pupils and the right attitude toward them.
6. That children may begin right and be saved from unnecessary failure and retardation or elimination in later grades.
7. To educate parents and foster a right attitude toward the school.
8. Finally, it is desirable in order to save the money of tax payers, now largely wasted, and so badly needed to provide for absolutely essential hygienic conditions.

Children who should be excluded from school are the following:

1. Those who have any infectious disease should of course be excluded from the school.
2. Children that have rickets, or the after effects of rickets to the extent that they are in poor physical condition and liable to develop neuroses or some other defect from the influence of school work.
3. All children who have tuberculosis, unless there are out-door schools in which they can be placed.
4. Children that are in a serious condition of anemia, unless again there are out-door schools where they can be placed.
5. Those who have any chronic disease that is liable to be aggravated by school attendance or would interfere with school work.

6. Those who are in a retarded stage of physiological or mental development where this would be improved probably by keeping them out of school, and where injury would be done by admission to school, or where it would interfere with school work.
7. Those who have serious sense defects.
8. Those who have any neuroses or the like that would be psychically contagious, epilepsy, chorea, stuttering, and the like.
9. Children who have not been vaccinated.

The importance of this entrance examination can hardly be exaggerated; and here is an opportunity where women's clubs, parent-teachers associations, and similar organizations may use their efforts to good effect, to bring about as soon as possible a public sentiment which will not only permit, but demand, a thoroughgoing examination of this kind. It is the next step that should be taken in health inspection. Of course any such proposition will meet objection, especially perhaps on the score of the expense involved. But as already suggested it would probably make for the highest economy in the end. And if one school or one community should give the plan a fair trial, the chances are that the movement would spread rapidly. In order to make the results satisfactory, however, the examination should be thoroughgoing, plenty of time should be taken for it, and both parents and teachers should be present.

Of course the practical man will say that a plan of this kind is admirable, but at present it is quite out of the question because it would never be possible to get parents to attend such an examination and give the necessary coöperation. Of course it might not be possible in all places, but it would be possible in certain communities at least to approximate a plan of this kind, and this is the ideal toward which health inspection should work. The present dissatisfaction with the schools, the present interest in so-called methods of efficiency in business and industry as well as the universal interest in the health and welfare of children, and the excellent results that would appear after a few years' experience with the plan, would ensure its being copied by other communities. The important thing is that it should be given a fair trial in some representative locality.

BIBLIOGRAPHY

1. ADDAMS, JANE. The home and the special child. Proc. N. E. A., 1908, pp. 1127-1131.
2. ARNOLD. H. D. Some results of the medical inspection of schools in Boston. Rep. Comm. of Educ., Washington, 1897-8, pp. 1494-1499.
3. AYRES, L. P. The relation between entering age and subsequent progress among school children. Education, 1912, vol. 32, pp. 325-333.
4. —— ——. Medical inspection of schools. Monroe's Cyclopedia of Education. N. Y., Macmillan, 1913, vol. 4, pp. 182-189.
5. BEIK, A. K. Physiological age and school entrance. Ped. Sem., 1913, vol. 20, pp. 277-321.
6. BURNHAM, W. H. Health inspection in the schools. Ped. Sem., 1900, vol. 7, pp. 70-94.
7. DRESSLAR, F. B. School Hygiene. N. Y., Macmillan, 1913, 369 p.
8. GULICK, L. H. and AYRES, L. P. Medical inspection of schools. N. Y., Survey Associates, 1913, 224 p.
9. RAPEER, L. W. School health administration. N. Y., Teachers College, 1913, 360 p.
10. RYAN, W. C. School hygiene. A Report of the 4th International Congress on School Hygiene. Buffalo, N. Y., U. S. Bureau of Education Bul., Washington, 1913, no. 48, 121 p.
11. SELTER, H. Handbuch der Schulhygiene. Dresden, Steinkopff, 1914. 759 p.
12. STEINHAUS, F., ET AL. Welche Anforderungen sind in körperlicher und geistiger Beziehung an den Schulneuling zu stellen? Zeit. f. Schulgesundheitspflege, 1913, vol. 26, Beiheft, pp. 16-77.
13. STRAYER, G. D. Retardation and elimination of pupils. Monroe's Cyc. of Educ. N. Y., Macmillan, 1913, vol. 5, pp. 169-171.
14. TERMAN, L. M. The hygiene of the school child. Boston, Houghton Mifflin, 1914, 417 p.
15. THIELE, AD. Versuch einer Biologie der Schulanfänger. Zeit. f. Schulgesundheitspflege, 1913, vol. 26, No. 6, pp. 377-386; no. 12, pp. 827-837.
16. WINCH, W. H. When should a child begin school? Educ. Psy. Monographs. Baltimore, Warwick & York, 1911, 98 p.

For a bibliography containing other titles and also covering the whole subject of growth, see the monograph by Bird T. Baldwin, "Physical Growth and School Progress," U. S. Bureau of Education, Bulletin, 1914, No. 10.

CONTEMPORARY UNIVERSITY PROBLEMS

By G. Stanley Hall

(Address at the exercises celebrating the twenty-fifth anniversary of the opening of Clark University, March 28, 1914.)

The story of Clark University during the quarter century of its existence, the close of which we celebrate today with the alumni, under the inspiring guidance of Dr. French and his committee, has in some respects no parallel in academic history. Especially the first few years of our annals have both brighter and darker pages than I can find in the records of any university. Thirteen of us instructors had taught or taken degrees at the Johns Hopkins, and we left that institution, which had added a new and higher story to the American university when it was at the very apex of its prosperity and hence were naturally inspired with the ideal of taking the inevitable next step upward, as indeed were all the other members of our original faculty, which was remarkable, if not unprecedented here, in its quality. Of the no less notable original Board of Trustees, every member of which has now passed away (while death has not once invaded the ranks of our professorial corps), the triumvirate, Hoar, Devens and Washburn, who stood nearest to Mr. Clark, as his executive committee of all work, estimated the resources that were ultimately to be at our disposal at from eight to twelve million dollars, and very likely more.

I was at the outset sent on an eight months' trip to Europe, with several score letters of introduction, including one from the national government which gave me access to the inside workings of *Kultus Ministeria* and university circles and archives, so that my trip constituted a pedagogic journey I think almost without precedent. Twenty-five years ago these very weeks I was on this unique mission and was surprised to find the most eminent men of learning in Europe profoundly interested in it, and so lavish with their time, sympathy and counsel. I was entertained by Lord Kelvin, Pasteur, Helmholtz, Jowett, and some scores of others of the greatest living leaders in scientific thought, went on a trip of inspection of German universities as the guest of the Prussian Minister of Education, von Gosslar, and, perhaps most embarrassing of all, was taken in state by General Trepanoff on a visit to the two great Russian military schools near St. Petersburg, in each of which an all day's program of military evolutions had been arranged for my special edification, was a guest of honor at a meeting of Swedish universities, etc. My instructions from Mr. Clark had been to see everything and every institution possible, collect building plans, budgets, administration methods of every kind, and find out a few of the best men who might be willing to come to a new institution here, but to engage no one but to be ready to negotiate with them later. The amazement to me was how lavish everybody was of advice, how cherished and often how elaborate were the ideals of university men, many if not most of whom seemed to have imagined installations of their own departments rivaling not only Bacon's House of Solomon, but sometimes almost suggesting apocryphal vision. From my voluminous notes of that trip could be compiled ideals lofty, numerous and far-reaching enough to inspire all the universities of the world for a century, and to organize a new one here for the conduct of which ten times ten million dollars would be sadly inadequate.

They gave me plans of the then new four million dollar university building at Vienna, of the new Sorbonne at Paris, its rival, of the complete new university which Bismarck had established at Strasburg to show Elsass-Lorraine, which Germany had just annexed, and to show especially France, what the Teutons really meant by higher education, of the newly built university at Kiel, in which Germany sought to impress upon the Scandinavians the same object-lesson, in her newly acquired Schleswig-Holstein, and which was designed to compete with the neighboring university of Copenhagen, just as she rehabilitated Koenigsburg to impress the same lesson upon the nearby Russian rival institution at Dorpat. I was given in some cases the secret *état* and the unprinted *Statuten* of the universities,—all this until I felt an almost Tarpeian embarrassment, especially as I was in nearly all these places utterly unknown and an object of interest solely because of my unique mission. I found young professors prone to see visions, and old ones to dream dreams, each for his own department, that all a king's ransom would be inadequate to make real. Of all this I wrote Mr. Clark and my colleagues here awaiting the great instauration. The harvest home-coming, with all these sheaves of suggestion and inspiration, marked the zenith of great expectation and of hope tiptoe on the mountain-top. For years and sometimes even yet, European savants who first heard of Worcester from me and have since known it only as the home of Clark University, seemed often, to our great embarrassment, to assume that many or most of the ideals that we then discussed together are now realized in this golden land of promise, and rank us far above our own modest sense of our deserts.

If I came home slightly intoxicated with academic ideals, so were all of us in some degree, according to our temperament, but a reality that was sobering enough soon confronted us. I cannot enter here upon the details of our disappointments, culminating in the tragic hegira to Chicago and elsewhere of three-fifths of our faculty. If ever there was an academic tragedy, a *via crucis,* a veritable descent into Avernus, it was here. The story of these years has been carefully written out, with everybody heard from, and all the divergent interpretations of what occurred and what it meant faithfully set down, and filed away in our archives, and perhaps after another twenty-five years or yet another, it may be published.

Suffice it to say that although we started with far less than, justifiably or not, we had hoped for, we began the fourth year, 1893-94, with only about one-fourth of the total annual resources that we had the first year. In the seven years that followed, down to the founder's death in 1900, we had for all purposes only 4% of the income of $600,000 plus that of $100,000 more for the library, that is, less than $30,000. Several of us who remained here were tempted by larger offers to what seemed more promising fields, but, on the whole, and I believe no one regrets it, we elected to stand by here. These lean years were, however, characterized by two features. First, they were years of unique harmony. There was no friction. We stood and worked shoulder to shoulder. And this is of prime importance in a small institution like this. In a great university discords can and always do occur, but here, where discontent in any department disturbs the whole institution, accord is one of the prime necessities. The other feature of these years was intense devotion to research and to teaching, and our productiveness, whether compared with our numbers or our income, has never been greater, and indeed, I wonder if that of any other institution has been greater relatively to its size. Perhaps the alumni of these days were, and will ever be, a little nearer to the center of the hearts of those who went through them, and it is significant, and can be no cause of jealousy to others, that it is they who are leading in the epoch-making activities that center about to-day and mark this as the date from which henceforth our alumni will be a potent factor in our future history. Their newly and well organized support, their enthusiasm for the spirit of research, which is our inspiration, will henceforth greatly reënforce all our best efforts here and be an inspiration to our future development.

With the dawn of the century came also the college, which has given us 51 students who have already taken degrees in the last eight years, although it has its own independent purpose. As to it, we are brethren, children of the same parent or, to change the figure, a married couple, and unlike married couples we can never be divorced, so that he who would make discord between us is an enemy to both, and every man who helps the other is a friend to both. Any encroachment of each upon the other's domain or any effort to profit or exalt the one at the other's expense, is bringing discord into sacred family relations. Our two-in-one or dual unity is unique, delicate, imposes new responsibilities and presents also inspiring possibilities for a new solution of some of the highest academic problems. I think we can truly say that each is now a noble stimulus to the other. We are proud of the college and we are so just in proportion as we know and understand its problems, aspirations and achievements. We are proud of the name and the work of its first great president and of the rare men he brought here, whose growth in knowledge and power, together with those of the college alumni whom they trained in his day, constitute his living monument, and we of the university salute the college colors in our decorations to-day, and hail with pride and give our heartiest Godspeed to the second president of the college, who is not only carrying out the ideals he inherited of a three years' course of non-athletic and citizen-building functions, but is going further and making the college a leader and light among others in the land. Would some one would offer a prize for some pregnant symbol, seal or even slogan or song typifying this unique conjunction, which college and university should forever unite to use! Could we not fitly commemorate this occasion by a new resolve that there shall never be tension or strain between us, and that a policy of mutual help shall henceforth animate us both?

In the recent voluminous literature on colleges, so much under discussion of late, we have several characterizations of the ideal college professor, and these agree pretty well. He must be a good man, a model citizen, a gentleman and a scholar, a teacher born, made or both, tactful, and in close personal relations with his students, anxious and able to teach them all they are capable of learning in his department, a man whose character will be normative and influential for good, fitting students, not for the university, nor even for professional or technical careers chiefly, but for their work in life in general, and evoking all their powers. Noble as are all these traits of nature and nurture, and rare as is their combination, and exacting as are the conditions of instruction and parental care, many college professors go further and are not even content with the useful work of making text-books but really add to the sum of human knowledge by their researches, and it is a satisfaction to us that so many of those here are with and of us in this respect.

For the university professor research is his prime function. He must specialize more sharply, must not only keep in constant and vital *rapport* with everything that every creative mind is doing in his field the world over, but he must hear and lay to heart every syllable that the muse of his department utters to every co-worker everywhere, and best of all, she must also speak new words through him. There is a vital sense in which he stands in closer relation to his co-workers in other lands than to his colleagues in the same institution. The chief momentum of the vital push-up in him impels him to penetrate ever a little farther into the unknown, to erect some kiosk in Kamtchatka, where he can wrest some new secret from the sphynx, who has far more to reveal than all she has yet told. Whenever he grows impotent to do this, he becomes only an emeritus knight of the holy ghost of science. Studies of the age when men in various departments do their best work show that scientists are the oldest of all the creators of culture values on the average, but that there is more individual variation, so that they cross the dead line both older and younger than any others. It is one of the hardest things in the world to be and remain a productive investigator. There are so many journals and books to be read, so many and constant alterations and adaptations, needful to press the questions we ask nature home and to get an answer, such changes of method and apparatus, so much that was yesterday new and will tomorrow be obsolete if we would not abandon what Janet calls *"la fonction du réelle,"* and take some kind of flight from reality and its ever pressing *devoir présent.* But if research is hard and the life it demands beset with dangers, so that many are always falling by the way without giving any sign of their demise to outsiders, this work has its supreme reward, and I cannot believe that there is any joy life has to offer quite so great as the Eureka joy of a new discovery.

Not only this work itself but its conditions are amazingly complex, unstable, and ever shifting. Just at present it seems to me that academic unrest was never quite so great the world over, and that the near future never promised so many important changes. Some abuses, great and small, have of late grown rank and demand remedy. Certain vicious tendencies must be corrected and reforms made. Bear with me if I ask you to glance briefly at a few of these.

Beginning with the Teutonic countries, since 1907 the assistant professors and docents have developed a strong inter-institutional organization against the head or full professors. The unprecedentedly rapid growth in the size of the student body everywhere has resulted in what Eulenberg calls a lush "Nachwuchs" of assistants of all grades. Statistics show that on the average the *Extraordinarii* or assistant professors receive this appointment at the age of 37, at an average salary of $523, and remain in this position nearly 20 years, attaining an average salary of $1,200, before promotion, at the average age of 57. These now constitute, with the docents, about half the teaching personnel of German institutions, and they often have neither seat nor vote in the faculty and little participation in the corporate life of the institution. In the municipal university which opens at Frankfurt next fall it was even proposed to have a president of the American type, to safeguard the assistants against the oppression of the full professors. A few years ago Tübingen, and last year Zürich, radically revised their ancient statutes to remedy these evils, and the projected university at Hamburg will go yet further. The two new universities in Hungary, at Pressburg and Debreczen, and the private one at Hongkong,—these grant more liberty and show more appreciation of the enthusiasm and ideals of the younger members of the faculty. Even students in Germany have caught the spirit of unrest, if not revolution, and now have a strong inter-institutional organization, and their pamphlets are boldly demanding better methods of teaching, printed outlines of professors' lectures, are trying to develop a sentiment that no instructor shall ever repeat in a lecture anything he has ever published, are calling for more options, especially more freedom of choice in the selection of subjects for their theses and more meaty topics for them that do not make their work ancillary to that of the professor, more personal rights to what they produce or discover in them, a longer period of *hospitieren* or of trying out each course before they finally sign for it, more and better seminaries with better tests for admission, more practical courses, better access to books, journals and library facilities generally, less over-crowding and more elimination all the way from *Ober-Sekunda* in the *Gymnasium* to the doctorate, better social opportunities, dormitories, more personal contact with the professors, less restrictions on their personal liberty, reform of the corps, honor system, and the *Mensur*. This unrest, although it seems ominous to conservatism, cannot fail to prevent waste and bring reform.

In the English universities agitation has had many recent expressions, from Lord Curzon's demand for reforms in 1909 on to Tillgard's of last year. Here the protestants grant that these institutions still breed the flower of national life, the English gentleman, but demand better library facilities than the individual colleges, with their wasteful duplication, afford, and especially more of what the critics so strenuously insist is still lacking and that parliament should enforce, namely, more teaching and research. Thus the deepening sense that something rather radical must be done seems now crystallizing into just what that something should be. In France and in Russia unrest is greater and reforms are more loudly demanded.

In this country academic unrest has been largely directed against organization and administration. In old days the college president, though he usually taught, was supreme and autocratic, and as leading institutions grew and he ceased to teach, the concentration of power in his hands became altogether excessive. The foundation of new institutions, the Hopkins, and a little later Stanford and Chicago, greatly augmented his power under our system. He had to determine the departments, select professors, fix their status, build, organize, represent the institution to the board and public, perhaps the legislature, plunge into the mad, wasteful competition for students and money, lay supply pipes to every institution that could fit. Never was the presidential function so suddenly enlarged nor its power so great and uncontrolled as a decade or two ago. Even the University of Virginia and other southern universities, which had only a president of the faculty, elected by its members, fell into line, and a reaction toward democratization, which in its extreme form seemed sometimes almost to adopt a slogan, "*Delindus est prex*," was inevitable. In the Cattell movement abundant incidents of arrogance and arbitrary, if not usurped, power were collected, and it was even insisted that although charters or conditions of bequest, to say nothing of American tradition, would have to be reversed, it was urged that the president should be only chairman of the faculty, elected perhaps annually by them, and in the literature of this movement we find occasionally the radical plea that some or all of the powers of the board should be turned over to the faculty, who should at least be given control of the annual budget. More lately the movement of protest here is against the autocracy of the dean, whom the president had created in his own image, and who sometimes exercises a power that he would never dare to do, and who in large institutions has constructed a mechanism of rules, methods, procedures, standards, which have almost come to monopolize the deliberations of the Association of American Universities, which fortunately cannot prescribe or legislate for its individual members. University deans have often created rules which they themselves can suspend for individuals, and this has greatly augmented their power. It is they largely who have broken up knowledge into standardized units of hours, weeks, terms, credits, blocking every short cut for superior minds and making a bureaucracy which represses personal initiative and legitimate ambition. Just now perhaps we hear most remonstrance against head professors and statements that the assistant professors and younger instructors in their departments are entirely at their mercy, that they are burdened with the drudgery of drills, examinations, markings, all at small pay, while their chiefs take the credit, so that the best years of the best young men, who are the most precious asset of any institution, or even of civilization, are wasted. Indeed we have vivid pictures of the hardships which often crush out the ambitions of young aspirants for professional honors and tend to make them, if they ever do arrive, parts of a machine with no ideals of what sacred academic freedom really means. Happily now the best sentiment of the best professors now organizing inter-institutionally to safeguard their own interests and those of their institutions, stands for a most wholesome and needed movement which is sure to prevail.

So far I submit to you and to my colleagues that Clark University, not through any wisdom or virtue of its president, although perhaps a little through the fact that he is a teacher and does not spend all his time in organizing, but owing to its small size, its unprecedented absence of rules, its utterly untrammeled academic freedom, is to-day in a position to lead and not follow in the wake of this movement. No one here wants autocratic personal power but we do all want the best attainable, whatever it is. Each department here is almost as independent and autonomous as if there were no other. We have no deans, few assistant professors, and so no tyranny of departmental heads, no complaints on the part of students, as in Germany, that we are not doing the best we can for them, so that this world-wide movement for academic reform we ought to consider as a great and new opportunity to us all, trustees and faculties, at this psychological moment to realize our own advantage, and to carefully look over our present system and see if we cannot use this opportunity to begin the new quarter century with our lamps retrimmed and burning bright, and alert and profiting by every suggestion that the academic *Zeitgeist* is now murmuring like the Socratic daemon in our ears.

Let us, then, look our present situation and ourselves frankly in the face. With the indefatigable labors of Senator Hoar in securing a just and legal execution of Mr. Clark's difficult will, labors which some of his colleagues in the board thought almost justified us in calling him our second founder, with a board more active and interested in our affairs, external and internal, than ever before, as their coöperation in this commemoration typifies, with our funds better invested and yielding a trifle more than they have ever done, with an admirable library, the creation, body and soul, of Dr. Wilson, who has the greatest genius of friendship of us all, with the re-establishment of the department of chemistry, which was dropped for a few years, with the increase of salaries, from time to time, as far as means permitted, inadequate though most of these still are compared with the increased cost of living, with more departments and professors and instructors, we seem to have entered upon a settled period of prosperity and growth that promises that the next quarter of a century will far transcend the past, and now that all the perturbations of the first formative era are over, we can look forward with confidence that the university will go on in the general direction it has already so faithfully held to during its period of storm and stress, *in saecula saeculorum.*

We have no greater distinction than that which has come from always preferring quality, attainment and ability to numbers, and that these standards may never be lowered is the most heartfelt wish and prayer of all of us. My greatest joy today is in the spontaneous testimonials of appreciation and loyalty of our alumni in leaving their work and coming here, at this most inconvenient season and sometimes from a great distance, and giving us or wording their cordial personal greeting and Godspeed, and even in contributing, not out of their abundance, for most of them are moderately paid professors like ourselves, but from a sense of gratitude and as a token of good will, to the fellowships which constitute our very greatest need.

Turning to the future, the changes we need here are largely but by no means wholly in harvesting what we sowed at the start and assiduously cultivated ever since, for which the time is now ripe. It would be preposterous to lay out our course now for another quarter century. We must always maintain keen orientation in an ever wider and more intricate field. To my mind there should always be a specialist here and in every institution in what might be called the higher pedagogy and in academic history, whose business it is to keep keenly alive to all that is doing in academic life the world over. Especially now, when these changes are so rapid, some one must spend much time in the outlook tower, and I would even hazard the strong opinion that had foreign institutions had a specialist in the conning tower, intent on studying the ever changing signs of the times and trained in academic statesmanship, many, if not most, of the errors that have caused our own and foreign universities so much waste of energy in recent years, might have been avoided.

The time is at hand when university rectorates, presidencies, chancellorships, or whatever their name, can no longer be filled by any professor or even outsider who can secure election, but will require men who, whatever else they are or know, are experts in the history of the higher culture and its institutions, from the four great academies of antiquity down, who know the story of mediaeval universities of the church and then of the state, of the guilds of scholars, the rise and present status of learned societies and academies, the great reforms of the past and the yet more significant reconstructions now evolving, the governmental patronage of learning and research, from the day of the Medici down to contemporary legislation for higher institutions, national and state, present-day centralization and the efforts against it in France, the many universities lately established by colonial policies, the world-wide movement of university extension. He must suggest ways and means to his colleagues for achieving their own even if unconscious ideals, help free investigators to be the supermen they are called to be, each in his own way, have a minimum of arbitrary authority and a maximum of faculty coöperation, catch and sympathetically respond to and find his chief inspiration in the fondest, highest, if secret, aspirations of each of his co-workers, who must not be content with the stale ways of the present perfervid competition for dollars and students or with the mere horizontal expansion, the multiplication of machinery or devices for efficiency of factory type, but study precedents, culture trends, and believe profoundly in the power of faculty democratization and do his utmost to develop it, regardless of his own personal or official prestige or authority. On the continent, mayors are trained professional experts, and cities vie with each other competitively for their services and find they can well afford to do so, for their special training means vast economies. Universities in this country if not the world over, are more nearly ready than are cities to profit by this example, and their gain thereby would be even greater. Twenty years ago Professor Paulsen of Berlin, the best representative of the higher pedagogy I plead for which that country has yet produced, warned German universities of the very dangers which have now waxed so grave, and with which they are battling, and the presidents here have only too good reason to look either with jealousy or with hope, according to their temperament, upon the now rapid addition of the higher story of academic pedagogy to the old schoolmaster's pedagogy of the grammar and high school, and development in this direction is another of the pregnant signs of the future.

Think of the changes since we began. Many special lines of research have their own institutions where little or no formal teaching is done, like astronomic observatories, the Rockerfeller Institute, Wood's Holl, Cold Springs Harbor, the Carnegie Institute, with all the possibilities of his will, the question of a national university, always with us, just now of the Fess hundred million dollar type, to be devoted chiefly to research, the enormous expansion of teacher-training in nearly every higher institution of this country, a movement that is almost without precedent in its magnitude and suddenness, the augmented stress laid upon practical applications of pure science,—these constitute a new environment, as also do the active and well organized but silent field agencies of most large institutions both to recruit students, with competing agents at the ear of every boy who thinks of going on, and also to place their graduates in every academic vacancy. These are problems to which a presidential or other agency must give great and growing attention and for which the president of the future must have special training, and in which also the faculty must share the burdens of administrative responsibility since questions must often be decided one way or the other while those who determine them are uncertain, themselves, so that criticism accumulates.

As to professors, the best of them make an almost unprecedented sacrifice and could have achieved the highest success in financial, professional, political (witness President Wilson) and other lines. They know the price they pay and are willing to pay it, but must have as their compensation the boon of security and liberty to teach and investigate freely what and how they will. The university professorate, too, means not only the cult of specialization but of individuality. Even idiosyncrasies are to be not only tolerated but respected and perhaps welcomed. The university should be the freest spot on earth, where human nature in its most variegated and acuminated types can blossom and bear fruit. The factory type of efficiency has no place there. Each must make himself as efficient as possible but in his own way and independently of all external circumstances, and without the multiplication of machinery, so that an able organizer with nothing to do but to administer might prove an unmitigated curse to all the best things a professor and even a university stand for.

Thus now I, who with one tiny exception have never, during all these twenty-five years, to a single citizen of Worcester hinted at a donation, will say a word which I wish all would hear and consider. We greatly need and shall always need more funds to strengthen existing and to found new departments. Though we bear another name, we are, fellow citizens, your University of Worcester. In all the spheres we touch, we have spread the name and added to the fame of this Heart of the Commonwealth. If we had ten million dollars more, not one of us would gain personally but should only have more work, for we are only administering the highest of charities.

If you doubt that this is the highest, listen to the conclusion of the report of the most elaborate parliamentary commission Great Britain ever knew, of forty volumes and nearly nineteen years in the making, covering all British charities of every kind, more than twenty thousand in all, which is: that of all objects of charity, the highest education has proven wisest, best, and most efficient of all, and that for two chief reasons, first because the superior integrity and ability of the trustees who consent to administer such funds, together with the intelligent appreciation of those aided by them, combine to furnish the best guarantee that they will be kept perpetually administered in the purpose and spirit of the founder whose name they bear; and second, because in approving higher education all other good causes are most effectually aided. Since the first endowment of research in the Greek academy, porch, grove and garden, from which all our higher institutions have sprung, thousands of spontaneous free will offerings have borne tangible witness to the sentiment so often and vividly taught by Plato, that in all the world there is no object more worthy of reverence, love and service, and none that it pays a civilization better to help to its fullest development than well-born, well-bred, gifted, trained young men who desire to be masters in an age when experts decide all things, for in them is the hope and the future leadership of the race, and to help them to more of the knowledge that is power is the highest service of one generation to the next. And how this has appealed to all ages! Oxford and Cambridge have 1,800 separate endowed fellowships and scholarships, to say nothing of the smaller exhibitions. Leipzig has 407 distinct funds, the oldest dating 1325, and wherever the higher academic life has flourished we find scores of memorials bearing the names of husbands, wives, parents, children, and providing for students of some special class, locality, or establishing or benefiting some new department or line of investigation, theoretical or practical; and now that the *rapport* of business, government, and all social and cultural institutions was never so close, all who give greatly and wisely, or who make or suggest bequests, have a new *noblesse oblige* to consider.

Cold facts and figures finally show a few things that I beg you all to ponder now. These are, that compared either with the size of our faculty, the number of departments, or our annual budget, we have fitted more men for higher degrees, seen more of them in academic chairs, where they are found in all the leading institutions of the land, including some dozen of presidencies, first and last, published more original contributions which seek to add to the sum of the world's knowledge, have a larger proportion of members of our faculty starred as of first rank in Cattell's census of the competent, had closer personal and often daily contact with students, and given more individual help outside of classes, had more academic freedom (for no one in our history has ever suffered in any way for his opinions), had more autonomy in our departments, each of which is a law to itself, had less rules and formalities of every kind, and had a president who was less president and more teacher, good or bad, spent less time in devising ways and means of seeking contributions from our friends here, advertised less and avoided all publicity more, until now, when I am, just for this one moment, throwing all our traditions of silence, modesty, absence of boasting about our work, to the winds. In these respects we exceed any of the other twenty-one institutions of the Association of American Universities.

This Clark University means, has stood for and will forever stand for, and this is why we all love and have put the best twenty-five years of our lives into her service and wish we all had another quarter of a century to serve her better, This is what brings you alumni back with your offerings, your loyalty and hearty good wishes. This is the university not made with hands, eternal in the world of science and learning. Clark University is not a structure but it is a state of mind, for wherever these ideals reign Clark men are at home, and all who have them are our friends and brothers.

It is this ideal that sustained us in our darkest days and now lights up the future with a new glow. Is there any joy of service to be compared with that of the investigator who has wrung a new secret from the heart of nature, listening when she has whispered a single syllable of truth unuttered before, who has been able to add a single stone to the great temple of learning, the noblest of all the structures ever reared by man? Is there any more religious calling than thus thinking God's thoughts after him, and proclaiming the gospel of truth to confirm faith, prevent illness, deepen self-knowledge and that of society, industry, give us mastery over the physical, chemical, biological energies that control the world, and develop mathematics, the language of all who think exactly, a language which all sciences tend to speak in proportion as they become complete? This is why research is religious and the knowledge gained in the laboratory to-day may set free energies that benefit the whole race to-morrow. Is not an institution devoted, heart and soul, to this sort of work, the best thing any community can have in its midst, and should it not be cherished as the heart of this "Heart of the Commonwealth?"

BIBLIOGRAPHY

1. A history of university reform from 1800 A. D. to the present time, with suggestions towards a complete scheme for the University of Cambridge. By A. I. Tillyard. Cambridge. W. Heffer & Sons, 1913. 392 pp.
2. Die Aussperrung der Psychologen, von Franz Hillebrand. Zts. f. Psychologie, 1913, Bd. 67, Heft 1 u. 2. S. 1-21.
3. Die Psychologie im Kampf. ums Dasein, von Wilhelm Wundt. 2nd ed. Leipzig. Alfred Kröner, 1913. 38 pp.
4. Der "akademische Nachwuchs," von Franz Eulenberg. Leipzig. Teubner, 1909. 155 pp.
5. Erklärung betr. Besetzung philosophischer Lehrstühle. (Signed by 107 Professors of philosophy.) Arch. f. systematische Philosophie. Neue Folge der Phil. Monatshefte, XIX. Band. Heft 2, Mai 15, 1913. 273 pp.
6. Eine Gefahr für die Geisteswissenschaften, von Karl Lamprecht. Die Zukunft. Berlin, Juni 1913. v. 21. 421-9 pp.
7. An Karl Lamprecht, von Georg Simmel. Die Zukunft. Berlin, Mai 1913. v. 21. 230-3 pp.
8. Rektorwechsel an der Universität Leipzig am 20. Nov 1913; Rede des antretenden Rektors Dr. Otto Mayer: Fichte über das Volk. Lpz., Alex Edelmann. 13 pp.
9. Wege zur Universitätsreform, von H. Kühnert u. H. Kranold. München, Ernst Reinhardt, 1913. 82 pp.
10. Das "Reformschulwesen" nach Altonaer und Frankfurter Lehrplan, von Julius Ziehen. Die Geisteswissenschaften, Feb. 19, 1914. Heft 21, p. 565. (And other articles in same no.)
11. Mitteilungen des Kartells deutscher Nichtordinarien-Organisationen. Nr. 1, Weihnachten, 1913; and Nr. 2, März, 1914.
12. Der Streit um die Universitäten, von Hermann Dannenberger. München. Max Steinebach, 1913. 44 pp.
13. Akademische Rundschau. (Monthly.) K. F. Koehler. Leipzig.
14. Denkschrift des akademischen Senates der Universität Leipzig zu der Dresdner Universitätsfrage (Lpz., 1. Dez. 1913.) Lpz., Alexander Edelman. 30 p.

SOME PSYCHOLOGICAL ASPECTS OF TEACHING MODERN LANGUAGES

By G. Stanley Hall

(Address at the meeting of the New England Modern Language Association, Boston, Saturday, May 9, 1914.)

After accepting the invitation to read this very slight paper with which your president honored me, a sense of my temerity has come home to me to a somewhat acute degree. I began academic teaching, I would have you know, as a professor of French, German and English language and literature, and continued for a whole year until I was demoted to the department of psychology, but I cannot find that I knew, taught or learned anything of pedagogic value about it. I also spent six years on the continent and acquired a certain practical knowledge of several languages, but just how I do not know, and this experience gave me little insight into pedagogic principles. Every few years I give a course of lectures on the psychology of language but here there is very little common ground with Flagstad, nor do I find that the few pieces of laboratory work in phonetics nor the clinical studies of aphasia, nor the development of speech in children, shed a great deal of light upon your practical problems. With this array of disqualifications, I can only fall back on a few general principles that touch your work only here and there, but which seem to me to be psychologically justified, and these I will briefly tab off in the hope that you will set me right if I am wrong, as follows.

1. To me it seems clear that if there is to be instruction in modern foreign language the age of about ten is for most children the best to begin it. If it comes before this the child has not developed sufficient *Sprachgefühl* for his *own* language, has not developed sufficient idiomatic sense of it to avoid the danger of interference, if we assume, as I am inclined to with P. G. Hamerton, that one language must always lead and that few, if any, can command more than one equally well. If we begin later the work is complicated with the phenomenon of mutation or change of voice, after which the vocal organs distinctly lose plasticity for new sounds and the ear for new discriminations. Thus with the dawn of puberty certain linguistic possibilities are lost beyond the power of

retrieval. This I think is the consensus of the competent on the continent and most here realize that we begin too late.

2. It seems to me that what is sometimes called the Frankfort plan, which insists that the study of a living must precede that of a dead language, has almost every pedagogic consideration in its favor. If Latin has preceded of course the old grammatical method has a little more justification, and should be utilized for all it is worth, but for direct or even natural methods the living language, with its vital interests and points of contact, ought to lead and perhaps set the pace and the fashions for the study of ancient languages if they are to follow.

3. I think all that we know of childhood confirms the theory that only one alien language should be taught at once, or at any rate that there should be a two or three year interval before a second is stressed. These three points seem to me so obvious that I leave them with bare mention and pass to the fourth principle, that the phonic emphasis of the Viëtor School brings, a new principle of great efficiency.

Language lives in the mouth, and a certain mouth consciousness, readiness in making and discriminating with the ear fine distinctions, hearing and especially pronouncing correctly and with a good voice not only give confidence but vitality to everything that follows. It is of course not necessary for the teacher to go into all the fine distinctions that glottology or the physiology of the vocal organs now lays down, but careful and discriminating well vocalized and well intoned pronunciation and much of it vitalizes everything, lays the stress where it belongs, and not only avoids both slovenly and also affected utterance but is a wholesome corrective of the misleading influences of our often fantastic, irrational and archaic spelling, and sets a standard which gives even the speech music of talking and listening to it a charm of its own. This method is a little like applying a microscope to a word. It gives it more individuality and opens wider and smooths the ways in which the soul wreaks itself upon expression. Utterance is the soul of speech, and motor control, which is the basis of every sort of efferent activity, culminates in correct vocalization. Compared with this, reading and writing are very late and long-circuit processes which distract and divert, so that hand and eye work, to which teachers are far too prone, tend to be duly subordinated. The phonograph can be a real help. Moreover, a sense of being able to pronounce correctly not only gives pleasure and confidence but sets up a standard which later favors idiomatic correctness and unquestionably greatly reënforces *Sprachgefühl.* Thus it seems to me one of the best tests of efficiency in teaching modern languages is how much of the total energy put into the work from the very first is vocal provided that vocalization be correct. In French and German schools I have seen drill on phonic charts and in one case even a fantastic nomenclature of sounds (" th " in " thin " called a lingual dental hisser, as distinct from " th " in " the " dubbed a lingual dental hummer). Yet it seems to me that despite constant dangers of over-refinement this method, if not carried to extreme, has justified itself and opened a new resource of which early teachers of modern language had little conception.

5. As to the value of accessory factors, these are of course very great, especially with the young, and first among them we must place reading and writing and all eye and hand work, which should be subordinated at first and come to their own rather slowly. As to reënforcement by pictures and objects, this is of course of the greatest value, and should be cultivated to the uttermost. The sight of a thing or act often brings up a forgotten word-image, and all the aphasias show the most intimate connection between the visual and auditory speech centers. I have been impressed with the two German chart systems made on the principle that everything possible spoken of in a foreign language should have at the same time a visual reënforcement because we cannot hold a word by too many associations, and the written image must in the early stages at least never get between the object or act and the spoken word. The Gouin principle of doing no doubt brings a reënforcement, but whether greater or less than that from the optical centers I do not think we can yet say. It certainly has its value independent of his series theory. To say, *" Ich wasche meine Hände "* and do it at the same time before the class means irradiation and a new *Bahnung* or facilitization in the brain and is unquestionably one important element in the psychological constellation which constitutes a real vital word. To this view it has been objected that in aphasias we often see *e. g.* a shoemaker who while he can talk glibly of politics, religion and other things, has lost the use of words like awl, leather, shoe, because by the use of these the manual centers have superseded those of speech; and so of the carpenter who has lost only the power to speak of his tools, wood and the things he makes. But this does not, as is sometimes urged, constitute an objection to deriving all possible help from activities in a process of learning a language, any more than the fact that in disease meanings are often totally divorced from words is an argument against unifying these early and intensively with the word. We must not forget that the complete acquisition of a word, *e. g.*, bell

(*Glocke*), does involve visual, auditory, manual and ideational centers that are distinct even in their localization. In its higher ranges this principle means great stress on *realia* such as is to a great extent impossible in teaching a dead language, so that every contact with living reality is like Antaeus' vital touch of Mother Earth. The method of having each pupil in this country put into correspondence with a German or a French child, every contemporary allusion to French or German literature, life, pictures, history, politics, reënforces because interest, content, meaning, is the muse as soon as the rudiments are passed. The Schiller Theatre in Berlin, for instance, which gives English and French plays free to children who have attained a certain mark in reading the play in school (which theatre is a part of the school system), works on this principle. Precisely as in teaching English the very most real progress is made when the child is utterly absorbed in the thing itself, so in learning a foreign language the prime function of all the learning processes is genuine zest, curiosity, desire to know and feel things of which the language is the only medium. That is why it seems to me that the classic works of the great French and German dramatists are a little too advanced for high school youth, that absorbing things on their own plane would be far better, and that is why when interest in a story, for instance, is intense, it is almost a pedagogic crime to hold up the children's impetuous zest to read on and see how the story ends by impertinent questions of grammatical construction or historical allusion or any of the irrelevancies that make up the often too vast body of notes in our textbooks. That is why the question of just what to read in French, German or Italian seems to me to be a question we have generally not solved aright. If we only had a scale on which to measure interest in content, then we should realize that the common life of the people, that connected incidents focussing to a denouement which touch fear, hope, love, and all the deeper, stronger emotions in which children are far more like adults than in their intellect, should be the determining factor in selection. How many incidents students of childhood and youth could adduce where an intense interest even in plays, games, in adventure, hunting, sea-life, and in older people a predominant interest in a specialty, proved an inspiring muse that has led its votary by leaps and bounds to a practical knowledge of a language! I have known several bright university students who in the preparation of their theses had to get something vital to their theme in Italian, of which they knew nothing, but whose interest was so great that in a surprisingly short time they mastered, not to be sure the language, but enough of it to get the content of articles and even books essential to their theme. I have an impression that modern language teachers need to revise the matter which they give to both high school and college pupils and that if they would utilize to the utmost this supreme impulsion of education, interest, they would be surprised to see how much faster their pupils' progress would be. We had for years an instructor who met our graduate students in each department who were lame in their modern languages and read only things in which they had an intense interest, often coaching individuals and helping them through memoirs they had to know for their doctors' theses, and progress in the facility of getting what they wanted in this way has almost always been remarkable. Method has its place I believe here as in every other department, but we teachers tend to magnify its importance and fail to see that it is always ancillary to the end, and the textbooks here as everywhere tend to make the teacher so method-conscious, so intent on his own way of synthesis and analysis that the pupil in the end is too conscious of the logical because the importance of the psychological, which is a very different thing, has been obscured.

6. As to the direct method, is it well, especially considering the late age at which most in this country begin the study of a foreign language, to affect the attitude of infancy, as if no other language was known? If the student knows anything of Latin it would be surely wasteful not to allow him to utilize the knowledge of both its grammar and etymology in studying French, and why as he already knows English should he not utilize all of it he can at the start? Perhaps it might be different if he were beginning to learn a tongue of a totally different linguistic stock like an agglutinative Mongolian tongue, but when we consider that English, French and German are relatives with the same parent, with differences that are only specific and not generic, it would seem that any modern language should at first lean as heavily as it can upon the vernacular. *Sprachgefühl,* if indeed it means anything, designates a sense or feeling of one particular tongue as distinct from another. Is there a special feeling for German, French or Italian, a genius of each of these tongues? If so it is not a simple but extremely complex constellation of special feelings that has to be very slowly built up and is not at all like a muse that presides over and inspires work from the first. One component of it is embodied in idioms, and these are many and slowly learned. Another component of it is found in words that cannot be translated without considerable loss of meaning in the process of decanting from one tongue to another. Another is the peculiar sentence sense,

the persistent governing power of prepositions, of split verbs and the other manifold bonds that connect all the phrases or grammatical elements of a sentence with the rest and constitute periodicity. Another is the speech music of pronunciation, which is somewhat different for each tongue. Yet another consists of figures of speech the tropical power of which is now more, now less submerged to consciousness and conventionalized. Another is made up of the unique vocal sounds and combinations peculiar to each tongue, and there are countless others. These are all separate and each one of them is very gradually evolved, and their synthesis into the whole comes later yet. Much of the difference between the *Sprachgefühl* of one tongue and that of another consists only in a different emphasis on elements common to both rather than in those that have no analogy with anything in another tongue. Again, speech, no matter in what tongue, has the same brain centers and uses the same organs. In the various speech diseases or aphasias the different sensory, motor and ideational elements may be struck out by cerebral lesion, showing the intricate and composite structure, but no disease ever destroyed the power to speak one language and left the power to speak others intact, and this shows that between different languages differences are very slight from a psychophysic standpoint compared with the differences between the elements of the same language. I think any expert introspector, no matter how accomplished a bilinguist he may be, will admit that the two tongues he commands are always like two horses unevenly matched, where one draws most of the load and is the leader and a little ahead. If two languages were entirely independent and the *Sprachgefühl* of one was separated by a watertight compartment from that of the other, there is every reason to believe that a new language would weaken our hold upon the vernacular, when in point of fact it should strengthen the other. Of course there are always untranslatable phrases in one language, but probably no more than there are sounds in one peculiar to another, and who would say that we should ignore such phonic elements as our own language contains in building up a new one? For myself I have spoken and especially read as much if not more German in the last twenty-five years in my own specialty than I have English, and I read rapidly and fluently, but introspection always reveals to me a very active if almost unconscious translating devil that is always very busy getting the meaning over into English thought, and for the most part phrase, and until this is done I do not hold the content by so firm a tenure. Thus the *Sprachgefühl* of the vernacular is always at work metamorphosing and recasting not merely thought but phrases, although I fully recognize at least in my own special department the distinct connotations of the foreign words from those usually thought to be their equivalent in English. In the kind of thinking that I do most of, viz., psychological, no matter what language I read I think nine-tenths or more of it in English, and the tenth that has no exact equivalent in English I treat a good deal as if it were additions to my English vocabulary. Once more, if the direct method involves a new beginning then we should profit to the uttermost by the now quite extensive knowledge we have of how children learn their mother tongue. Of the very many child vocabularies there are now common features enough to guide us to a vocabulary in the foreign tongue that would have a genetic presupposition from the foreign source in its favor. There are very characteristic constructions and errors of many sorts are inseparable from the process of learning the mother tongue, and yet these errors are part of nature's way. There is a rather constant proportion of nouns, verbs, adjectives, forms of construction that are characteristic of beginners, and this genetic, which is very distinct from the logical method, is the one that should be followed in a method that is severely direct, and certainly talking on this principle long precedes reading and writing. Hence it is really psychologically impossible for an adult to approach a new language independently of every support which his present knowledge of the vernacular or any other tongue, ancient or modern, can afford him.

Finally, I have less and less respect for all hyper-methodic ways of learning a new language, because however subtle they may be, the ways of nature are indefinitely more subtle and complex. I think psychologists interested in the psychology of speech can regard the pedagogic methodizations that often loom so imposingly here as cheap and superficial. Unquestionably all the newer ways have helped to make modern language teaching more efficient than it used to be, and the impulses given in this field by Sauveur, Berlitz and now Viëtor and Wolter, have all contributed, so that to my mind the ideal for the teacher to strive toward is to know all enough to use the best elements of them all by turns, but to resist extremists who insist that there is only one best way and who would tie them down to any inexorable and exclusive method, although an enthusiast in any does often accomplish marvels. I would also have every teacher have certain specific devices of his own, and especially his own centers of interest, with which he should try to infect the class, but with all this the center of this work, it seems to me, must forever be drill, practice, repetition, work in season and out of season, and yet as in everything else the muse which alone can make even drudgery attractive is interest. Every teacher who can generate an interest in things French, German, Italian, breaks down the resistance which the most willing pupils unconsciously offer to the acquisition of new skills.

We are and have been, as Handschin's conspective sketch shows, slow and backward in teaching and learning foreign tongues. With the size, the isolation of the country so unlike that of crowded Europe, in many parts of which one must speak, and in every part of which it is more necessary to speak other languages than the vernacular, this backwardness was inevitable. It has gone with a certain provincialism that has characterized our national spirit. Our ignorance and lack of appreciation of things foreign is both cause and effect of our complacency with a knowledge of only one tongue. Even our foreign policy, not to mention here our consular and diplomatic service and our trade, has suffered incalculably as compared, for instance, with the Germans, because of this provincialism of which the sad, though on the whole rather brightening statistics of our ignorance of languages is little more than an index, but is a part. Our whole attitude towards all Latin America south of the Rio Grande is more vitally than we think connected with the fact that in the north and east parts of the country at least we know almost nothing of Spanish. Let us hope that having as a country so recently entered into the great family of nations with world-wide interests, we shall now qualify for this new rôle and inoculate the million young people in our secondary and academic education with the spirit of other great contemporary nations, not merely with the grammar and vocabulary of these lands, but make them feel their life, share their aspirations, understand their points of view, and thus strengthen fraternal bonds and increase the motives of peace and good will between them and us.

A CLASSIFICATION OF UNIVERSITIES AND COLLEGES IN JAPAN AS COMPARED WITH THE UNIVERSITIES OF THE UNITED STATES

By **Yoshi S. Kuno**

It is almost impossible to classify the Universities and Colleges in Japan under the four classes as defined by Professor Kendrick C. Babcock in his "A Classification of Universities and Colleges with Reference to the Bachelor's Degree," because their organization is so different from those in the United States. I have therefore prepared this paper by first defining and explaining each type of higher institution in Japan and then classifying them by following Prof. Babcock's plan as closely as practical. In collecting data I have made extensive use of the 38th Annual Report on Japanese Schools, issued by the Department of Education of the Government of Japan in 1912.

All students desiring to enter higher institutions of learning are educated uniformly during the first eleven years: viz., six years in the Elementary School and five years in the Middle School. Then they are free to matriculate in institutions of different kinds according to their aims and means. Some students now enter immediately a professional or technical school such as The Higher School of Commerce or Higher School of Technology, etc., as enumerated in Class 3, and begin their Collegiate work. Students intending to pursue a University Course are obliged to study for three years longer in The Higher School, where they pursue higher secondary education, or to study for a year and one-half or two in a preparatory department in a private university, in case they do not aspire to attend an Imperial University.

Japanese Universities and Colleges may therefore be divided into three different classes according to their standing and the amount of higher secondary education required for admission. They are (1) The Government Imperial Universities; (2) Private Universities; (3) Technical and Professional Schools of the standing of the Higher Schools.

Class 1. To graduate from a Government Imperial University with a Bachelor's Degree, the work in the following schools must be completed:

	Years
1 Elementary School (Zinjō Shō-gakkō)	6
2. Middle School (Chū-gakkō)	5
3. Higher School (Kōtō-gakkō)	3
4. Imperial University (Tei-Koku Dai-gaku)	3
	17

The reason why it is necessary for a Japanese student to spend 17 instead of 16 years as does the student in America to obtain a University degree is because of the difficulty of studying so many languages, it being necessary to study in addition to modern European languages, the Japanese spoken languages and the Japanese and Chinese classics.

Class 2. To graduate with a Bachelor's degree from a private university such as Waseda or Keio, it requires 15½ or 16 years, as follows:

	Years
1. Elementary School (Zinjō Shō-gakkō)	6
2. Middle School (Chu-gakkō)	5
3. Preparatory Department (Kōtō-Yoka)	1½–2
4. Private University (Shiryu-Dai-gaku)	3
	15½–16

Comparing these figures with those of the Government Imperial Universities, we find that a student can graduate with a Bachelor's degree in 1½ years' less time from Waseda and in 1 year's less time from Keio. This is the reason why the Government Imperial Universities do not consider the private universities of equal rank with them and do not admit their graduates to post-graduate work in the Government Imperial Universities.

Class 3. To graduate from one of the Technical or Professional Schools of the Higher School standing requires 14 years, as follows:

	Years
1. Elementary School (Zinjō Shō-gakkō)	6
2. Middle School (Chu-gakkō)	5
3. Technical or Professional School (Zitsugyo gakkō)	3

Although some institutions of this type have a one year preparatory course, yet most of them admit graduates from the Middle School immediately to college work. Although the names of these schools are often translated into English as "Colleges," yet the Japanese government does not recognize them as such but classifies them as "Schools of Industrial and Practical Knowledge," and does not allow them to confer the Bachelor's degree. However, there is one exception; that is

"The Tokyo Higher School of Commerce" which has been permitted by the government to establish a two years' graduate course and to confer the Bachelor's degree upon the completion of this.

In order to accurately compare the Universities and Colleges of Japan with those of the United States, the Middle Schools and the Higher Schools in Japan should be clearly defined. In the first place, there is no school in Japan, the standing of which corresponds to that of the High School in the United States. The Middle School in Japan is practically equivalent to the Introductory High in America with the addition of two years' work particularly devoted to the study of languages and mathematics. During these five years, the students are able to complete the work of the Introductory High, all secondary school work required in mathematics, and about one-half of the other work given in the American High School.

In the Japanese Higher School, the student completes the work given in the American High School together with most of the work given in American universities during the Freshman and Sophomore years.

In the Japanese University, the course includes work corresponding to upper division work in the American University together with such lower division courses as are too specialized to permit of their being given in the Higher School.

Taking all these facts into consideration, and taking Class I of American Universities as a standard, Japanese higher institutions may be classified as follows: to make the status of the university more clear, the number of students enrolled and the annual running expense are given in connection with each institution.

CLASS I

	No. of Students	Annual Expense
1. Kyoto Imp. Univ.	1,375	$565,400
2. Tokyo Imp. Univ.	4,670	752,700
3. Kyushu Imp. Univ. (in process of organization)		
4. Tohoku Imp. Univ. (in process of organization)		
5. Grad. Dept. in the Tokyo Higher School of Commerce. Number of students and expense given under the heading of Tokyo Higher School of Commerce.		

The institutions above mentioned are fully equal in grade to Class I of American Universities. Their graduates may be admitted to the graduate schools of Class I Universities as candidates for the Master's degree with the privilege of receiving the same upon completion of one year's graduate work.

CLASS 2

	No. of Students	Annual Expense
1. Doshisha Univ.	46	$11,700
2. Keio Univ.	2,112	41,400
3. Waseda Univ.	3,989	93,200
4. Sapporo Agriculture College	793	129,100

The standard of Sapporo College has been raised and the college no longer exists as a college, but it has been consolidated into a department of the Imperial Tohoku University.

Note: The amount given for Doshisha apparently includes some temporary expense, although the report does not so state.

Graduates from these Class 2 institutions lack a year or a year and one-half of the education received by graduates of the Imperial Universities. Therefore, these graduates may be admitted as post graduates with the privilege of becoming candidates for the Bachelor's degree as specified on page 57 of the University of California Bulletin, Vol. 5, No. 10, issued April, 1912, or as candidates for the Master's degree upon the completion of two full years' work.

CLASS 3

	No. of Students	Annual Expense
1. Aoyama Gakuin Col	89	$2,700
2. Chuo Univ.	994	27,400
3. Hiroshima Higher Nor. Sch	437	81,200
4. Hosei Univ.	675	15,200
5. Kagoshima Higher Sch. of Agriculture & Forestry	120	21,400
6. Kansei Gakuin Univ	665	7,300
7. Kumamoto Higher Sch. of Technology	280	34,300
8. Kyoto Higher Sch. of Technology	253	32,100
9. Kobe Higher Sch. of Commerce	543	35,300
10. Kyoto Hosei Univ	152	4,500
11. Meiji Gakuin Col	160	7,500
12. Meiji Univ.	1,566	18,500
13. Morioka Higher Sch. of Agriculture & Forestry	262	34,100
14. Nara Woman's Higher Normal School	150	32,700
15. Nagasaki Higher Sch. of Commerce	374	31,700
16. Nagoya Higher Sch. of Technology	309	42,500
17. Osaka Higher Sch. of Technology	600	58,600
18. Osaka Higher Sch. of Commerce	295	26,200
19. Osaka City Sch. of Tech	252	23,900
20. Okura Sch. of Commerce	470	16,700
21. Rikkyo Gakuin Univ	61	3,200
22. Sendai Higher Sch. of Technology	429	43,300
23. Senshu Univ.	347	10,100
24. Tohoku Gakuin	22	4,400
25. Tokyo Higher Sch. of Agriculture	290	6,400
26. Tokyo Higher Sch. of Commerce	1,485	60,200
27. Tokyo Higher Normal	656	106,500

CLASS 3—*Continued*

	No. of Students	Annual Expense
28. Tokyo Higher Sch. of Technology	792	88,500
29. Tokyo Woman's Higher Normal School	356	61,400
30. Tokyo School of Foreign Language	659	42,900
31. Toyo Kyo Kwai College	236	3,700
32. Toyo Univ.	176	6,400
33. Woman's English College	105	5,000
34. Woman's Univ. (Nippon)	324	28,000
35. Yamaguchi Higher Sch. of Commerce	359	33,400
36. Yonezawa Higher Sch. of Technology	41	11,400
37. Nippon University	1,409	16,100
38. Shiryu Meiji College	93	31,900

The institutions of Class 3 are Government Professional and Technical Schools of Higher School standing, and also private universities and colleges, the support of which is insufficient and the standing poor. Their graduates should by no means be permitted to register as candidates for the Master's degree. As the expense column shows, the government Higher Schools have far more adequate appropriations than the private universities and colleges. But, on account of the lower standard of education in these Higher Schools the government will not permit them to confer any Bachelor's degree. Only the Tokyo Higher School of Commerce has a special provision by which the Bachelor's degree may be given, as mentioned above, upon the completion of two additional years of graduate work. Therefore, graduates from Class 3 institutions may be admitted to the University of California with the privilege of becoming candidates for the Bachelor's degree upon the completion of two or three years' undergraduate work in the University. In past years, the University of California has admitted graduates from these institutions as Special students in the undergraduate course. After they had demonstrated their ability to carry university work, the University gave them due credit. This worked very satisfactorily and seems to be the most advisable.

"THE MARKING SYSTEM IN THEORY"

By Edwin G. Boring
Cornell University

The last ten years have seen the publication, in educational and scientific journals, of more than a dozen papers dealing with proposed reforms of the systems of marking now generally followed in colleges and universities. The writers advocate, for the most part, an assignment of marks in accordance with some theoretical principle. The awakening of teachers to the need for a real understanding of the basis upon which grades are assigned is, indeed, most desirable; and it appears, from the instances in which one or other of the new systems has already been adopted, as if reforms were about to be realized. It is, however, all the more important that every new proposal should be subjected to the most careful scrutiny. If the aim of our reform is to avoid injustice, we must be eagerly zealous to avoid any new injustice inherent in the reform itself.

One of the most recent and definite proposals for the alteration of the present scheme of grading has been put forward by I. E. Finkelstein in a book entitled, *The Marking System in Theory and Practice.*[1] The work presents a large body of facts, methodically arranged, which furnish a powerful argument for reform. Its final plea is, however, for the establishment of a system of marking, in which the quality graded shall be assumed to be distributed in accordance with a frequency curve that is skewed[2] toward the upper end of the marking scale. As the assumption is open to criticism, and as the whole question of marking is of importance at the present time, a critical examination seems warranted. Finkelstein advances four arguments in behalf of his special contention (pp. 11-16). We propose to take them up in order.

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[1] *Educational Psychology Monographs,* Baltimore, 1913.

[2] Finkelstein's notion of 'skewness' is not altogether clear. If he intends his mention of a "skewed curve with the mode to the right of the middle of the abscissa" (p. 16) as a definition, we are probably to understand that a curve is skewed in the direction in which the mode is displaced. Without any previous mention of skewness at all, he presents a figure in which the curve is said to be "obviously skewed to the left" (p. 12); but obviousness is scarcely a rigid criterion. What, for example, is to be said of the curve figured in this article? In it the mode is "in the middle of the abscissa,"—that is to say, the mode and the median coincide. For Finkelstein the curve would not be skewed. For E. L. Thorndike (*Theory of Mental and Social Measurements,* 1913, p. 77), however, this curve would be skewed, since, by the "approved" formula, skewness depends upon the deviation of the median from the average.

(1) It is this author's first task to show that "the elimination of the academically unfit by the mill of the public school system does not produce a distribution like that of *Fig. B* [which is skewed toward the left, *i. e.*, toward the lesser degrees of ability], but leaves us, after all, the form of distribution shown in *Fig. A* [which is the normal frequency surface]" (p. 14). Finkelstein thinks that, if there were an elimination of those lowest in ability, the natural result would be a lopping off of the left portion of the curve, resulting in a skew in that direction.

He first quotes Judd[3] to show that "the elimination is not so severe . . . as is often supposed." "A study of the large high schools in the city of Chicago in its relation to the University of Chicago," he quotes, "shows that students go to college from every level of scholarship above the passing mark." But it should be noted that the boundary is 'the passing mark;' *some*, therefore, are eliminated. In the passage quoted, Judd is arguing, not that colleges admit inferior individuals, but merely that they admit mediocre ones, that there is not a high degree of selection: "It is not likely to be true that any institution will draw sharp lines of college admission or will attempt to maintain standards which exclude the mediocre student."

After Judd, Meyer is cited.[4] "College teachers usually assert that the curve of distribution is not the normal curve, but a skewed curve . . . They are usually ready to explain this by referring to the elimination of poor scholars in the high schools and lower schools. I have considerable doubts

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Further, it is important to note that Finkelstein uses 'skewness' in exactly the opposite sense to Thorndike (*cf. ibid.*, p. 33; or the earlier edition, 1904, p. 31, which was available to Finkelstein). Finkelstein's curve, which is "obviously skewed to the left," would be said by Thorndike to be "skewed toward" the right, and the formula for skewness is consistent with this latter view. In order to avoid confusion, *we shall throughout this discussion use the term 'skewness' in the sense in which it appears to be used by Finkelstein*, viz., *the displacement of the mode to the one side or the other of the median*. Finkelstein's reversal of an accepted usage should, however, not be forgotten.

[3] Judd, C. H., *On the Comparisons of Grading Systems in High Schools and Colleges, School Rev.*, 18, 1910, p. 469. The reference in Finkelstein to vol. 19 is incorrect.

[4] Meyer, M., *Experience with the Grading System of the University of Missouri, Science,* N. S. 33, 1911, p. 666.

as to this elimination. Is the work done in high school really so much like that done in college that there is a large previous elimination of poor college students?" There is an omission indicated by Finkelstein in his quotation. The passage from Meyer reads: "College teachers usually assert that the curve of distribution is not the normal curve, but a skewed curve like that of the continuous lines." The 'continuous lines' refer to a figure showing a curve skewed to the right. Finkelstein quotes Meyer to show that the curve is not skewed to the left; Meyer is actually maintaining that the skew is not to the right. Perhaps the end is the same in either case, *viz.,* that the curve is normal; but the error shows within what confusion we are working when the same sort of elimination can be held to skew the curve either the one way or the other.[5] How, in such circumstances, can we expect to come to a reliable conclusion? And, in fact, Meyer does not pretend to do this (although Finkelstein does not cite the relevant passage); for he writes, on the same page, "I do not admit, then, that anybody has proved thus far that the distribution of scholarly accomplishments in college is like the normal curve or like a skewed curve either way."

Finkelstein, however, seeks to go farther (p. 13) than the bare statements of Judd and Meyer that selection is not severe at the time of entrance into college. He quotes Huey[6] to show that "retardations occur continuously on up the years of growth to maturity," and suggests that "the remnant" that "arrives at college," after "its arrested members have dropped out by elimination," is still represented by the normal curve, because "the poorest of the surviving members represent a minimal ability just sufficient to cross the dead line of university entrance." The poorest drop out; but the distribution among college students remains unaltered, because others are retarded to take the places of those eliminated. So is nature become the handmaid of the academic statistician! It is not made clear why she is not equally concerned by the embarrassment of the general biometrician at the discovery that the distribution of a general sample of the adult population must now, on the basis of the same argument, be skewed to the left,—for the general sample must include the normally distributed sample at college *plus* a large mass of the previously eliminated. Finkelstein himself, in speaking of "native ability," says that "in any population its distribution is that known as the curve of error, the probability curve, or Gauss's curve" (p. 11). In this connection we do not need to differ from Huey. Throughout his paper, Huey places in opposition the ideas of growth and retardation. Both are continuous. The mean of mental ability advances with age, but retardations continually occur to a greater or less extent; they affect, more or less, the whole sample of population, and thus they increase in range while the mean advances. There is no reason, however, to assume that the curve for the whole sample is anything but the normal surface. Huey might just as well have spoken only of retardation, in which case the genius would have been described merely as the least retarded; or he might have considered only growth. The point is, in the first place, that Huey says nothing to indicate that a sample of the total population is not distributed normally; and, in the second place, that, if it is so distributed, then the separation from it of a large selected portion—such a selection as Finkelstein freely admits—would be very unlikely indeed to leave a symmetrical curve.[7]

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[5] Some recent figures published by D. Starch (*Reliability and Distribution of Grades, Science,* N. S. 38, 1913, p. 635) seem to indicate that a continuous progressive elimination to a point beyond the median might result in a curve skewed to the right. W. T. Foster (*Scientific Distribution of Grades at Reed College, Science,* N. S. 35, 1912, p. 887) assumes a displacement to the left,—the form that Finkelstein appears to attribute erroneously to Meyer.

The actual significance of Starch's curves does not concern us here, because we are arguing on purely theoretical grounds, whereas his curves are based on actual findings.

[6] Huey, E. B., *Retardation and Mental Examination of Retarded Children, Jour. Psycho-Asthenics,* 15, 1910, p. 41 (not page 43, as Finkelstein states).

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[7] For the sake of accuracy it should be noted that, according as selection tends to lop off the one end of the curve only, or to affect the whole group (in an increasing absolute amount) to a point somewhere beyond the median, the curve will be skewed to the left or right respectively. The first condition is what one would naturally expect, but it is conceivable that the lower two-thirds of the population, for example, should contribute, in proportion to their numbers, more or less to the general elimination. If both conditions are possible, then the intermediate case of the symmetrical curve is also possible. It is, however, improbable; and, in any case, Finkelstein should have shown all the possibilities, rather than have left the reader with the impression that the evidence preponderates in favor of the normal form of distribution.

A word here may not be amiss concerning the conclusions of other writers with respect to the curve. College teachers, according to Meyer (*loc. cit.*) are inclined to accept a curve skewed to the right. Foster (*loc. cit.*) bases the Reed College system on one skewed to the left. J. McK. Cattell (*Examinations, Grades, and Credits, Pop. Sci. Mo.*, 66, 1905, p. 372) selects the normal surface as a sort of compromise between displacement to the left, which he thinks is what might be expected, and displacement to the right, which is what he actually finds. Cattell says that the latter form is due to the tendency of the teacher to mark up (p. 375), but does not say why he is unwilling to explain in this way the whole difference between the theoretical and the actual forms. Meyer (*loc. cit.*), lack-

(2) Finkelstein's second point is that "marks should indicate, not ability, but accomplishment" (p. 14). He continues; "Is accomplishment distributed like ability? We have argued that accomplishment is the result of ability, *plus* previous preparation and zeal. When like zeal or effort is exhibited by two pupils, the one dull and the other brilliant, it seems probable that the gifted pupil reaps a *proportionately* larger result. It is as if effort were multiplied into ability rather than added to it. It is difficult to prove this assertion, but if it be admitted, the conclusion is evident that, if all the students put forth the same amount of effort, the curve of accomplishment would be skewed to the right." This is the argument in full. There has been no attempt to increase its obscurity by condensing it in transcription. Apparently what Finkelstein means is this: Ability is distributed normally. Zeal is assumed tentatively to be equal for all. It is effective for accomplishment in proportion to the amount of ability. Thus the normally distributed 'ability' is multiplied by the constant 'zeal' to give the curve of accomplishment. The result is, of course, not a skewed curve, but another normal curve. The form of a curve is never altered by multiplication by a constant.[8]

(3) In the third place, Finkelstein maintains that "when a marking system is arranged to measure accomplishment,

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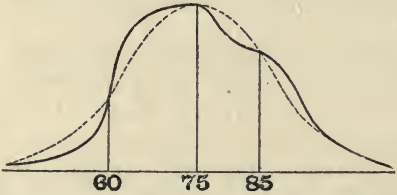
ing evidence, takes the normal surface as the most probable form. So also does W. F. Dearborn (*School and University Grades, Bull. Univ. Wisconsin,* 1910, No. 368). A. G. Smith (*A Rational College Marking System, Jour. Educ. Psych.,* 2, 1911, p. 388) adopts the normal surface, because, "although only a small proportion of high-school graduates take a college course, it is fair to assume that the majority of such graduates have mental ability sufficient to take such a course, and a large percentage of the students who do not finish the high school would, if given a fair chance and encouragement, be capable of development and completing a college course." A majority,—but, like Finkelstein, Smith forgets the minority. And all these writers seem to expect the elimination to occur, like a sudden visitation of Providence, between graduation from high school and entrance into college. Why can not they learn from Huey that "retardations occur continuously on up the years of growth to maturity,"—in infancy, in the primary, in the grammar grades, in high school, in the college, in the graduate school? Surely the imbecile is eliminated from the college ranks, though every high-school graduate take his Ph.D.!

[8] Finkelstein's meaning may possibly be that accomplishment is dependent *both* directly upon ability *and also upon* effective zeal, which is, in turn, dependent upon ability. Thus accomplishment would be the sum or product of these two normally distributed factors. But since the one is ability, and the other is directly dependent upon ability, the curves could not be displaced relatively to each other and the resulting surface could not be asymmetrical.

another factor undoubtedly enters to skew the curve further to the right. This factor is the incentive offered to certain groups of students by the critical points of the system. Thus, at Cornell University, where a mark of 60 or above is necessary to pass, there evidently exists a type of student of inferior or average ability who aims for this mark. The possibility of exemption from final examination by obtaining a mark of 85 in preliminary examinations offers also a powerful incentive to students of average ability to push their accomplishment to the extent of their ability. Again, an average student, by persistent effort, may hope to obtain amark of 80 or over, and thus be eligible for consideration for Phi Beta Kappa and other special honors. On the other hand, the brilliant student, who probably profits most by effort, cannot attain a mark above 100, and it is not difficult for him to obtain a mark of 85 or over. The net result, then, of the imposition of a marking system is to crowd the grades of accomplishment forward to the right, and thus, again, to tend to form a skewed, and not a bell-shaped curve" (pp. 15f.).



Hypothetical curve of distribution of marks on percentile scale. Median and mode at 75%; hence (in Finkelstein's terms) the curve is not skewed. Departure from normal surface (dotted lines) is explained by additional 'zeal,' which may raise values normally below 60 to amounts between 60 and 75, and values normally between 75 and 85 to amounts above 85.

It is true that the effect of additional zeal or effort on the part of special groups would result in a curve that is not bell-shaped; but it is not necessarily true that the curve would be skewed in the sense that the areas on either side of the mode are unequal, that is to say, that the mode and the median do not coincide. In the figure is shown a curve in which a number of individuals, falling below 60 in the normal distribution, have been displaced to a position above 60, and in which the same sort of alteration has been made at 85. The curve is irregular, but it is not skewed.[9] If it were the case that the additional effort of the students, who would naturally fall below 60, brought them above 75, or if the struggle to pass 85 extended in any large measure to those who would otherwise receive less than 75, a skew might occur. In such a case, however, the increase of effort would extend to a very much larger number of students, and would be effective to a very much greater extent, than Finkelstein seems to imply.

(4) Finally, the advocate of this system of marking would have us believe in the displacement of the ideal surface to the right, because "the actual distribution of over 20,000 marks in Cornell University is a curve skewed to the right" (p. 16). So, then, we are to reform our distribution by reference to the distribution itself. Could anything be less promising to a seeker after a 'scientific method of grading'? It is true that Finkelstein regards his curve as reliable because it is the "*consensus gentium*" of the faculty. But to this we may reply, in the first place, that if the *consensus gentium* be the just standard, then the individual student, whose final fate in college depends upon the average of a large number of marks, is not so badly off as we had supposed; and, in the second place, that a reformer has done but half his duty when he has corrected the unjust deviations from the mean without inquiring into the deviation from justice of the mean itself. If it is at all demonstrable that special factors might be operative to skew the actual curve to the right, then this curve can not be considered as a basis for the ideal distribution. And it is not difficult to suggest influences that might be operative.

(a) The curves of both Cattell[10] and Finkelstein are skewed to the right; that presented by Starch[11] shows a far lesser skew; and, in fact, Starch assumes that it is symmetrical.[12] Dearborn[13] finds the distribution practically normal. Since the curves do not agree, there must be some special factor operative, knowledge of which would explain the difference.

(b) A factor that is apparently effective in skewing Finkelstein's curve to the right is inherent in the method of assigning final marks at Cornell University. Students having a grade of 85 at the end of the term may be exempt from the final examination. Those who take this examination have their grades raised or lowered, as the case may be, by its result. It thus happens that, while students below 85 at the end of the term have a chance to be raised above 85, the students above 85 have no chance of being lowered, because their work is already completed. Thus it happens that there is a weighting of the curve in favor of the student. In some courses, where the final examination is made easy, the effect would be considerable; and in those courses in which the grading by final examination is substituted for grading by term work, the differences would be very great indeed.[14]

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[9] It is only in Finkelstein's use of the term that we can say that the curve is not skewed. By Thorndike's definition it is skewed, but it is skewed in a manner that in appearance somewhat resembles Finkelstein's skew, not to the right, but *to the left!*

[10] *Op. cit.*, p. 374.

[11] *Loc. cit.*

[12] Critics, however, on the basis of the figure shown, might object to the statement that "the distribution of the marks of college freshmen . . . in fact does conform to the probability curve." (p. 364.)

[13] *Loc. cit.*

(c) Finally, it may be suggested tentatively that, among other factors operating to skew the curve to the right, there is the fact that instructors do not regard all units on the marking scale as equivalent. It seems probable that a unit at the upper end is considered as more significant than a unit at the lower end. We hesitate more between giving 80 and giving 85 than we do between 20 and 25. Most instructors think nothing of giving a mark of 20% to an answer, which they would have marked zero had they continued to deduct for errors and omissions at the rate at which the first 10% was deducted. If, for example, Finkelstein's curve were replatted with an irregular scale of abscissae, so proportioned that from 85 downwards equal units of abscissa represent uniformly increasing numbers of percentile grades, the curve might very well be symmetrical. It is approximately symmetrical, if, as equivalent groups, there are selected the grades 0-44, 45-53, 54-61, 62-68, 69-74, 75-79, 80-84, 85-89, 90-94, 95-100.

It appears, then, that special factors may be present which determine the actual curves; and that, therefore, it is scarcely legitimate to utilize these actual curves as a basis for the determination of the ideal curve.

In general, Finkelstein's conclusion that "the pattern or theoretically ideal curve of high-school and college marks is, therefore, not the probability curve, but the skewed curve with the mode to the right of the middle of the abscissa"

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[14] Finkelstein speaks throughout as if the number of marks of 85 or above actually represent (at least in the College of Arts and Sciences) the number of exemptions that were or would have been given; and he speaks as if the percentage found at 85 or above in the general curve represented the percentage that should receive exemption in practice. Such a procedure, on his own assumption that the average curve is the ideal one, would, for the reasons shown, be incorrect.

(p. 16) cannot be justified. Just what harm his assumption might work can not be definitely stated. We can say only of *The Marking System in Theory and Practice* that much more seems to be known of practice than of theory; and that, if reforms are to depend upon both—as, indeed, it would seem that they must—a more careful induction is needed than has hitherto been presented.

MEETING OF THE NEW ENGLAND COLLEGE LIBRARIANS

At a meeting of the New England College Librarians at the Library of Clark University, April 25th, Dr. H. L. Koopman, Librarian of Brown University, in opening the discussion on "The Position of the Library in the College" said:

"My remarks apply not to the university library but to the college library, and to the library of a college remote from any large reference collection.

"Only a generation ago the college library played a very small part in the life of the undergraduate; now it is generally admitted to be the most important single element in his academic training, and to be indispensable to the operation of all the rest. Books are bought for his reference use, for his collateral reading in connection with class work, for his preparation in debate, for his private reading to the end of culture or even entertainment; and to these are added a liberal supply of periodicals. There is therefore little danger that his interests will be overlooked in making up the library's annual budget. But how about the service of the library to the professor?

"Take the case of the young professor, coming to the college fresh from research work in connection with great libraries, and confronted with the problem of finding a living level between his high enthusiasms and his low salary. He has never before known or guessed what it means to lack the very breath of his scholarly life, and he feels like a mouse in an exhausted receiver. He has a few books of his own, but they are growing out of date with every passing month. Obviously, on his salary, with the family obligations that ought to be his, he cannot afford to buy a tenth of the books and journals necessary, not for research, but to keep him abreast of the times in his specialty and to nourish the enthusiasms that he brought with him. How is he met at the college library? Are his enthusiasms hailed as a college asset, or are his requests frowned upon as an attempt at a kind of private intellectual graft? There must be many college professors who can testify to a cordial appreciation and support of their personal studies as sources of academic power; but we fear that a much larger number would report a painful lack of any such recognition. No one can have a wide acquaintance with American colleges and not recall many instances of atrophied professors, men who live in the past tense. They once knew, and then blessedly forgot, that they have ceased to be in vital connection with their subjects; but their students know it. They may still impart knowledge, but they cannot impart intellectual life, for that they no longer possess. The loss is theirs, of course, even if they are unconscious of it; but it is no less the college's loss. What avails our boasted equipment, if that element of its product which gives the chief value to all the rest shall be found wanting when the product is delivered to the consumer?

"It is not enough to say that the professor should avoid colleges where he will be condemned to intellectual dry-rot; he may sometimes be able to choose, but oftener he will not be able. It is for the colleges themselves to recognize their duty to their public, and to provide every professor with the means to preserve and increase his intellectual life. If it is pleaded that an attempt to provide equally for the library needs of professors as well as students would mean only to starve both, we must remind the objector that American colleges have now passed the pioneer stage when all things were forgiven to newness. A right of way is no longer enough to constitute a road; modern travelers demand macadam. If a college cannot back up the professions of its catalogue, cannot keep faith with its students,—for it all comes to this,—it had better close its doors. The world is filled with appeals to college loyalty—mostly financial; let those who respond see to it that in applying their contributions the intellectual life of the professor is not overlooked. His return will be in the form of that life transmitted, even if it is no longer also that of Chaucer's scholar, who

'busily gan for the soules preye
Of hem that gaf him wherwith to scoleye.'"

Dr. Louis N. Wilson, Librarian, Clark University, following Dr. Koopman, said:

"I agree absolutely with all Dr. Koopman says, but how is a better state of affairs to be brought about? Is the difficulty due to lack of means, or is it due to a failure to recognize the true value of the library to the college? Is it not due more often to faculty administration than to lack of funds?

"The great majority of our college libraries are administered by a committee of the faculty and if the young professor or instructor has not been properly fed by the library does not the fault lie with his faculty colleagues? My own impression is that while the professors of a college are deeply interested in a good library, and cannot well conduct their courses properly without it, they have not shown any marked ability in guiding it in the past. I sometimes think that the library should be divorced absolutely from faculty control and should be as independent as any other department of the college. The librarian should be directly responsible to the president, and while he will, if he is qualified for the position he holds, consult freely with his colleagues, he will accomplish far more for the college as a whole if freed from faculty control.

"In apportioning funds we know how insistent heads of departments are concerning the needs of their departments. Do they ever insist upon the needs of the library if by doing so their laboratory or teaching appropriation is likely to be affected? Are they not too vitally interested in securing departmental appropriations to be the best advisors for the library? I may be entirely mistaken about these things, but I would very much like to know."

The above was submitted to several professors and librarians for comment and brought forth the following responses. —[Ed.]

Dr. Koopman's remarks are limited to an appeal for attention in the College Library to the needs of the faculty in individual research. No one would dissent from them. The question would be one of means. The material required by the individual professor for "research" proper, would be apt to be material of the unusual sort; that is to say, material beyond that which would be necessary to the collection as a "good working library" for a *College*. With ample resources, it may be procurable, but if the alternative be to procure it through the omission of the books which are fundamental to the good work in a Library or a College, it must inevitably be foregone.

The device then available is: to borrow it for his use from some University, State or Municipal library, or the Library of Congress, as opportunity may offer.

Sympathizing with the spirit of Dr. Koopman's appeal, Dr. Wilson apprehends in an effort to meet it, a tendency to delegate the control of selection to the faculty itself. Such a course, with an actual partition of the purchasing funds among the several departments, is quite usual in academic libraries. Never having administered in an academic library, I have no personal experience of the effects. I am not ready to believe that they are more favorable to any one individual member of a faculty, than if the selection were left to the librarian untrammeled; and it is quite clear, in the nature of things, that removal of the authority from him will be *apt* to endanger the organic integrity of the collection as a working library, by the application of the funds, or a large fraction of them, to the purchase of material of an interest but transitory, special and limited to the momentary caprice of a specialist, preparing, perhaps, a critical commentary, or otherwise merely "particularizing."

This apprehension indeed seems in terms to concern, not merely the selection of books, but the administrative control of the library; from the tendency to vest this in the faculty, I heartily dissent. That there should be a committee of the faculty "on the library" is obvious, but the relation of that committee should be purely advisory, with, of course, the authority when specially conferred, to consider and report upon a suitable policy for the library, and, when called upon, to report upon its conduct. As far as administrative control is concerned, however, there should be no intervening between the President of the institution and the Librarian.

HERBERT PUTNAM,
Librarian of Congress.

Until less administrative and class room work is required of college professors and salaries of both college professors and librarians are larger, we are not, it seems to me, warranted in asking for appropriations for the purchase of books for specialists. The diligent specialist will in any case make use of the larger libraries during vacations and sabbatical years, and the book post now makes books in these libraries fairly available at all times.

I feel as Dr. Wilson does that more authority should be given to the president of the college, and more to the college librarian. In other words, the same autonomy should be given to the library which is given to other departments of the college. At the same time, it is desirable that there should be a larger measure of publicity regarding library expenditures.

W. D. JOHNSTON,
Recently Librarian Columbia University.

If I understand aright the point at issue and the matter on which you desire a brief comment, the following statements represent my views.

(1) College students should be required to purchase for themselves more of the books assigned them for required and collateral reading than is now the custom. I think that if the necessities of the courses taken call for it, a student might fairly be asked to spend fifty to seventy-five dollars a year on books. I have known of students who worked in a factory during vacation in order to make a contribution to the funds necessary for the college baseball and football teams. If such sacrifices are made for athletics, I think they might also be made for literary material. Such a practice would annually release many hundreds of dollars of library funds now expended for duplicate copies and material not particularly useful for purposes of investigation.

(2) Administratively the library should be considered an independent part of the college, or at least just as independent as a fully organized department of instruction, e. g., history, romance languages, etc. The librarian should have the rank of a full professor, be entitled to a seat and vote in the faculty, and be directly responsible to the president. If there is an advisory council on the library he should, of course, also be a voting member of that body. Whatever may be the manner of administrating the affairs of the library and apportioning its funds, there should always be proper faculty representation, but rarely, if ever, unrestricted faculty *control.*

(3) One of the greatest difficulties confronting college and university library administration at the present time is the lack of men able to take a broad and well coördinated view of the library situation as a whole. As a result of buying to meet the needs of specialists, our collegiate collections are as spotted in character as a leopard's skin. They are usually conspicuously lacking in the fundamental ma-

terials for the study of a particular field of knowledge, material which should first be acquired before any attempt at gathering intensively the literature of a particular division of that field.

(4) Bearing in mind the financial limtiations characteristic of nearly all small colleges, I cannot see much hope of their being able to acquire the materials for advanced investigation and research. Their only chance of acquiring such material is the receipt as a gift of some great scholar's collection or a large special fund the income of which may be used exclusively for the purchase of books on a given subject. To build up a collection of books and manuscripts suitable for original investigation in a wide range of subjects would require an annual expenditure of at least $25,000 for books alone for a very considerable series of years.

W. N. C. Carlton,
Librarian Newberry Library.

Dr. Koopman's remarks on "The Position of the Library in the College" at the recent meeting of the New England College Librarians are quite worth serious consideration. I am in hearty accord with the views expressed, and I do not hesitate to add that the President and Trustees of Smith College encourage and liberally support a library administration which keeps in mind the needs of the professors as well as of the students. Especially on the appointment of new professors they are asked to suggest books and periodicals which may not be in the library, yet needed in connection with their work, both personal and with classes. Every year several special appropriations are granted for the purpose of bringing up to date material thus requested. It is the fault of the individual professor if he "lacks and suffers hunger," and not of the administration, in so far as encouragement and provision for satisfying his needs are concerned. There is no "dry rot" among the professors, to my knowledge, and there is no library committee of the faculty, the library being "as independent as any other department of the college." Whether there is any significant conclusion to be drawn from these facts, I cannot say.

Josephine A. Clark,
Librarian Smith College.

It is, I suppose, out of the question for any College, however well endowed and however wisely administered, to provide a research library for all of its professors and departments. The Universities themselves make no such lavish provision; any extensive bit of research, wherever undertaken, means that books must be borrowed from various sources.

But our professor is not helpless. (1) He should keep in touch with the head of the University department which he has just left. He should take with him, to his new quarters, a programme of research, made out with direct reference to the materials available in the College to which he has been called; and when a new problem presents itself he should lay it before his University professors and get their advice. They are not infallible, but they have a perspective. (2) Private libraries are worth more than Dr. Koopman thinks. Every graduate student should subscribe for two technical journals, one of them foreign, and should spend a stated percentage of his income in the purchase, from second hand catalogues, of the classics of his science. If he follows this plan, and avoids buying current text-books, he will carry away from the University the nucleus of a working library; classics and standard periodicals do not fall out of date with every passing month. Unfortunately, the American student is not by nature a book-buyer: but he may be advised. (3) The University libraries will lend books to the Colleges. The present plan of borrowing and lending is cumbrous and wastes time, and individual librarians have their prickly sides; but in principle the loan of books is provided for. Let the College library, now, take upon itself the expenses of correspondence and carriage; let it regard this sort of expenditure as a necessary and profitable thing; let it assign a fair amount to every department for the procuring and return of books needed in research. It will have bought fewer books, at the end of the year, but it will have kept its professors alive. I do not know anything of the control of College libraries; but this requirement implies, plainly, that the library funds be impartially administered for the benefit equally of all departments; it implies also that the annual income of the library be stable and not subject to violent fluctuation. On these points I agree with Dr. Wilson. (4) It should not be forgotten that annual bibliographies give the student of today advantages undreamed of twenty years ago. The College library may and should possess these bibliographies; for access to them enables the professor to get his bearings in a way that supplements, very usefully, the recourse mentioned under (1).

Professor E. B. Titchener,
Cornell University.

I am, of course, a rank outsider in matters of library economy and organization; but an experience of many years in various American and other universities has given rise to certain convictions regarding this question. The more I see of the practical working of various plans of organization and administration, in universities and elsewhere, the more am I convinced that the policy which proves most satisfactory to all concerned consists in first choosing a competent individual, then enclothing him with as much power as possible and restricting him just as little as possible in his mode of procedure, and finally in holding him responsible for "delivering the goods." This general plan of operation not only promotes harmony, but it makes the officer feel that the success or failure of the discharge of the duties of his office rests with himself alone. Applied to library administration, this means simply that a competent librarian is better qualified than any member of the university faculty to administer the affairs of the library; only where the librarian is incompetent should a portion of his powers be delegated to a library committee,—but even in that case a much more successful solution of the problem would consist in securing the services of a librarian who is competent. The Clark Library is more successfully administered than any other library that I have ever had occasion to make use of either in America or in Europe; and I for one would very much regret any step that would curtail in any particular the supreme power of the librarian in matters concerning the administration of his library.

Professor J. W. Baird,
Clark University.

REFORM IN EDUCATION

By Robert Bennett Bean

Some reflections as to the present status of education in America, reflections that have come as a result of extended studies in the eruption of the permanent teeth, have prompted me to suggest a scheme for saving time in education without loss of essential values otherwise. There is a waste of at least two years in the present plan of American education. This is the conclusion reached by a committee of prominent educators in a report on "Economy of Time of Education" just issued by the United States Bureau of Education, and I believe a greater waste than this is present.

The conclusion follows an investigation lasting nearly 10 years by a Committee of the National Education Association,[1] of which President James H. Baker, of the University of Colorado, is chairman. The committee have endeavored to form a plan that would do away with the two year loss. They propose that 6 years be assigned to the elementary school instead of 8 as at present; that the high school period be from 12 to 18, divided into two parts, of four and two years each; that college work extend from 18 to 20, or 16 to 20, according to the method of distributing the last two secondary years; and that graduate or professional work at a university cover the years from 20 to 24. This would enable boys and girls to get ample vocational training after the age of 12; it would enable those who go on to college to get through their college work at 20; and it would save the professional man from having to wait until 27 to start his professional career.

The report insists that the present elementary course is too long; that the ground now covered in 8 years can be covered just as efficiently in 6, allowing secondary work to begin at the age of 12. To save on elementary schooling they urge: "Choose the most important subjects and the most important topics; make a distinction between first-rate facts and principles and tenth-rate. Confine the period of elementary education to mastering the tools of education. Include the last two years of the present elementary school in the period of secondary education and begin the study of foreign language, elementary algebra, constructive geometry, elementary science, and history two years earlier than at present."

Emphasis is laid on the necessity of concentrating on a few valuable studies: "The great mistake of our education is to suppose that quantity and strain constitute education. Education is a question of doing a few essential things well and without over-strain. The college has committed a grievous mistake in demanding ever more in quantity rather than in quality produced under conditions of healthy normal development."

The report takes up the problem of saving time in education from the point of view of the college, the school, and society at large, as well as of the individual pupil; and it contains opinions on every phase of the question from representative school men and the general public.

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[1] *Economy of Time in Education.* Bulletin U. S. Bureau of Educ., 1913.

It has seemed to me that the professional man should start before the age of 24, because several years after graduation from a university should be devoted to experience in the profession before the actual work of life has begun, as is now being done in the medical profession by internes in hospitals. There is no more reason why inexperienced engineers, lawyers, or others should be foisted upon an innocent public than physicians. It is true that we should cut out the non-essentials in the primary schools, and lop off the excrescences, and there is much to be said in favor of repairing the foundation before the superstructure, but in a plastic system it may be well to begin in the middle and work both ways. A fitting capstone for a school system may become a suitable foundation for more advanced education. Compression may well be started with the university and the secondary schools, by allowing the first two years of the former to count also as the last two years of the latter and thus securing the Bachelor's and Doctor's degrees both in six years.

Education is the full rounding of the individual mentally, physically and morally, and should be approached from the biological standpoint as well as from any other. At the age of 16 years practically all the structures and functions have attained their competency, and at this time four vistas open before the youth on the threshold of life. The muscular, mental, sexual and alimentary activities are ready for ripening: exercise, study, the passions and the appetites are in full play. They may be grouped in two categories, motor and sensory. The muscular and mental activities are motor, the sexual and alimentary activities are sensory. The motor activities control the sensory, but if the sensory activities are ripened at the expense of the motor, the body may control the mind. It is essential that the motor activities become dominant, and that they may become so they must not only be exercised well, but as expressed by Henry James stresses and strains that reach the physiological limit of endurance will not only keep one occupied but will enable one to do more thereafter. The youth should be driven hard from 16 to 20 years of age because at that age the appetites and passions are strongest in youth, and this is the time when the mind and body are capable of responding to stresses and strains, therefore it is expedient at this time to give the mind the greatest amount of work it can endure, and to keep the body fit to nourish the brain, that by so doing the passions and appetites may be subordinated.

The crucial period of the 6 years course that I advocate for the completion of secondary and advanced education is the first two years, and this should come at about the age of 16 to 18 years. At the end of this time the student should have completed Mathematics through calculus; Latin, Greek and English; German, French and Spanish; Physics, Chemistry and Biology; and Civil Government. The courses should be complete, such as for instance in Chemistry through quantitative and qualitative analysis, organic and inorganic; and in Biology to include the dissection of a mammal, and the microscopic study of plant and animal tissues.

This should fit a person for anything whatsoever in life, and if advanced study is undertaken the next two years should be devoted to the fundamentals of the specialty selected, and the two years after that to the practical applications of the subject in the nature of original investigations.

The first two years work should entitle the participant to a certificate or degree of the fundamentals; the second two years to the Bachelor's degree; and the third two years to the Doctor's degree, which should be specific, as Doctor of Medicine, Doctor of Law, Doctor of English, Doctor of Engineering, Doctor of Agriculture, or what not. The first two years should be given in all the high schools, colleges, or other secondary schools, and well equipped teachers and laboratories should be provided for the courses of this period. All primary education should be raised to conform to this standard, and all advanced education would be raised following it. In this way the age of 18 would be the starting point for the young entering a business or other enterprise, the age of 20 would be the starting point for those who could not complete a professional education, and the age of 22 would be the starting point for the professions.

In consideration of the fact that at least four classes of students exist, a few exceptionally gifted, a few exceptionally poor, a large class of rapid workers and a large class of slow workers; or those who are unusually precocious, or unusually backward, and those who are only slightly precocious or slightly backward; in consideration of this, there should be at least four provisions made to meet the needs of all.

The selection of teachers is the most important task of the educator, and until the pay of teachers exceeds that of bricklayers, carpenters and plumbers, the best intellects will not be attracted to teaching except as a means of self-denial. The teachers in the primary schools should have the gifts of keen insight into human nature; the instincts of the born commander, and the power of imparting to others the essentials, whereas the teachers in advanced courses should have not only the powers of analysis and synthesis in productive thought, and the quality of exact observation with correct inference, but also the power of transmitting to others both inspiration and enthusiasm.

AN EXPERIMENT IN TEACHING SPELLING

By Martha J. Fulton
Paterson, N. J.

Aside from the teaching of Reading, perhaps, no other study in the curriculum of school education leads to more discussion than the subject of Spelling.

Many tests of spelling ability of school children have been made in the past few years with results varying as widely as the prejudices of the experimenters; in one instance the test seems to show absolutely no benefit from the years of spelling-book "grind;" in another the spelling drill shows appreciable results. The chief difficulty lies in the interpretation of the results, a difficulty which would disappear if the tests were of methods rather than mere results. Experiments in spelling, such as were made in the Horace Mann School of Columbia University, in which the conditions were carefully controlled so that there need be no ambiguity in the interpretation of the results, are needed to guide the class teachers in the selection of a method or methods.

No method should be established in a classroom without a preliminary, carefully-controlled experiment to determine what is best adapted to the children individually.

A professor in one of the leading universities of New York City has declared that a child learns to spell when simply assigned a lesson and told to study the words, leaving the method used entirely with the child itself. This might prove satisfactory in a few instances where the children are naturally good spellers. There are many, however, who lack this ability to picture the word, and for these some form of drill seems necessary.

To determine the exact benefit, if any, arising from persistent drill in spelling words the following experiment was made with a 4-B Grade in a public school where the children in attendance are of average ability.

One hundred words were taught in two weeks (ten school days), ten each day, using this procedure:

I. Write word upon the board.

This presents to the child an opportunity to visualize the given word, or, expressed differently, to enable the child to form a visual image of the word before him. The basis for this lies in the fact that a large per cent of children learn best by the process of "seeing."

II. Explain meaning of the word.

Many words are entirely lost to the child for want of a thorough understanding. When the meaning of a word is clear in the mind of a child, the successive appearances of that word make a far greater impression than if it is unknown. This is aided by the next step:

III. Children use the word in a sentence.

Knowledge becomes useful when one possesses the ability to apply it. A child takes a greater amount of interest in words that he can use freely, taking his own vocabulary as a means to support the new word.

IV. The children write word ten times and while writing say each letter aloud.

Most individuals can learn more readily and retain longer the words gained by writing and talking at the same time. The letters are made to implant a mental word picture in the minds of the children, through the ears for those with "audile" memories, and from the lips and fingers for those with "motile" memories.

V. Emphasize by intonation of voice or by colored chalk on blackboard the difficult parts of the word.

A thing is better remembered when it reaches the mind with greater intensity than ordinarily. If the "hard" part of the word, for instance, the "yg" in "hygiene," stands out prominently and is memorized thereby the other parts tend to go along with it.

At the end of the ten days drill a test in the one hundred words was given with the result as shown in column I, table I.

TABLE I

Number of pupil	I Spelling with drill	II Three weeks later	III Spelling without drill	IV Three weeks later
1	100	100	78	64
2	100	98	74	68
3	100	100	94	94
4	100	100	86	84
5	100	98	86	80
6	100	100	54	40
7	100	100	72	60
8	100	100	86	80
9	100	98	90	92
10	100	98	72	68
11	100	98	80	80
12	100	98	84	86
13	98	100	82	74
14	98	98	78	70
15	100	100	88	72
16	94	100	74	70
17	98	96	72	72
18	98	94	92	92
19	98	90	64	60
20	98	92	46	40
21	98	90	70	68
22	98	88	44	40
23	96	100	70	66
24	96	94	58	50
25	96	96	64	60
26	94	88	68	68
27	94	96	58	50
28	90	90	54	50
Average	98	96	73	68
Average deviation	1.9	3.4	11.2	11.8

Following this a group of one hundred words of similar difficulty (all the words were taken from Hick's Champion Speller, pp. 40-41) was given the children during ten school days with no directions except to "study the lesson." The children were "heard" in their spelling each day and the next lesson assigned, but no effort was made to teach the spelling. A test of these words at the end of the ten days produced the results shown in Column III.

Three weeks after the test of the first group of words (no mention of them having been made in the meanwhile) another test was made to see what per cent of the words had been retained. The results are shown in column II. A test of the second group three weeks later produced the results shown in column IV.

Table II shows the number of children who fell below, remained stationary or increased their averages after the three weeks interval. The few cases of increase are due probably to the children having accidentally seen the words in reading or otherwise and thus become familiar with them. It will be seen that not only was there a 25% loss in spelling ability when the drill was stopped, but the ability to retain over a long period of time was affected in 25% of the children.

TABLE II

Summarized from columns I and II of Table I:

With drill	Below in the second	14 or	50%
	Same in both	10 or	36%
	Above in the second	4 or	14%
		28	100%

Summarized from columns III and IV of Table I:

Without drill	Below in the second	21 or	75%
	Same in both	5 or	17%
	Above in the second	2 or	8%
		28	100%

DAILY RESULTS, ALL PUPILS

With drill	99%
Without drill	78%

CONCLUSIONS

The results of this experiment may be summarized in the following statements:

I. Spelling drill is necessary in any class where the children vary in ability.

II. The best results are obtained by presenting the words in as many ways as possible.

1. Spelling orally.
2. Visualization of words.
3. The combination of writing and talking.
4. The correlation of word with its meaning, to fix a permanent impression.

III. Constant drill.

IV. Awakening of interest.

By presenting devices which will appeal to children of various stages of intellectuality.

V. Actual Supervision.

Methods of study should be given to the children and continually supervised by teacher.

THE ANATOMY OF SCHOLARSHIP

By Gilbert Cosulich

There are some who regard the scholar merely as a sponge: an object that does not assimilate or contribute, but simply absorbs. They believe that learning involves neither culture nor research. "Scholarship," says one writer, "is pedestrian in its methods, and requires only industrious application for its achievement . . . culture is to be attained only in more difficult ways, and under more genial guidance." "A high degree of learning may exist quite apart from special investigation," observes another essayist.

The divine thirst for data is, of course, the best safeguard against false conclusions. The true scholar examines, compares, and tests his facts before he announces results; and even then he very frequently understates his case. Too much of our modern criticism, as the present writer has elsewhere endeavored to show,* is all conclusions and no data.

But although learning begins with facts, it does not end with them. There are, indeed, data-sponges whom the people choose to call scholars; but the legal maxim that common error makes law does not apply to abstract standards. The English scholar who has transcribed his marginalia on a hundred thousand slips would be nothing more than a cataloguer if this classified collection did not assist him in his constructive criticism.

The man of learning is more than a mere encyclopedia; he is ideally a seer, an interpreter, a creator. The commentator that by reference to Catullus explains to me a meaning in *In Memoriam* has done what no encyclopedia could do: he has been a mediator between a great intellect and mine.

The phrases "unproductive scholarship" and "dry-as-dust learning" are both contradictions in terms. Scholarship must produce; and, however indirect be its processes, it must have some vital objective. James Watt was a scholar because he alone interpreted facts that were probably known to almost any engineering undergraduate at Glasgow. Stedman deals with parallel passages not as an end but as a means. Erudition is not dead, but living: a beacon, not a cobweb.

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* "Of Generalities in Criticism," *The English Journal,* November, 1912.

NOTES

SOME REPORTS FROM BOHEMIA

New Accounts of the Life of J. A. Comenius. The Bohemian pedagogical review, *Pedagogickê Rozhledy,* publishes in numbers 7 and 8 (of this year) new accounts of the life of John Amos Comenius, the great Bohemian educator in the seventeenth century. The accounts are according to recollections of J. A. Comenius himself, from his work, "Continuatio Admonitionis fraternae de temperando charitatis zelo." Many sheets of this till now unknown work of the great educator were discovered by the Bohemian University professor, Kvacala, in the Public Library in St. Petersburg. The recollections begin at the departure of J. A. Comenius from his fatherland and they end at the year 1658. In these sheets also the voyage of Comenius to London in the year 1641 is described. The Bohemian educator was invited to London by the Parliament itself, after a speech of Dr. Gaudentius, who recommended the pedagogical efforts of Comenius. Comenius was received by Sir Samuel Hartlib and the Archbishop of York. He was offered the management of the college of Chelsea. But a rebellion in Ireland and the departure of the king interrupted all negotiation. Because Ludvig von Geer invited Comenius to Sweden, he was not hindered by his English friends (Archbishop of York, Earl Brook, Dr. Pym and others) from departing for that country.

The Pedagogical Literary Association of Bohemian Teachers, "Dědictvi Komenského" (Legacy of Comenius), celebrated this year the twentieth anniversary of its foundation. The association published in twenty years 45 special educational works for teachers, 10 volumes of the Library of Pedagogical Classics (Comenius, Locke, Rabelais, Rousseau, Tolstoi, G. S. Hall), edited by Fr. Drtina, Ph. D., Professor of Philosophy and Education in the Bohemian University of Prague, 17 volumes of the Encyclopedic Library, 5 volumes of the Child Study Library (edited by Fr. Čáda, Ph. D., Professor of Philosophy in the Bohemian University of Prague), 41 volumes on contemporaneous educational problems, 36 volumes of a School Children's Library, 3 musical volumes and some pictures. The organ of the Association is the greatest and best Bohemian pedagogical monthly, "Pedagogické Rozhledy." It has 14 departments: Pedagogy and History of Education, Educational Matters of the Elementary School, National Education, The Slav School World, Religious and Moral Education, Education for Arts, Child Study, Child Pathology, Children's Literature. Care Committees, Physical Education, School Hygiene, Review of Pedagogical Reviews. Each department has its own editor (three university professors—the chief editor, Fr. Drtina, Ph. D., Ot. Kádner, Ph. D., Fr. Čáda, Ph. D.,—two secondary school professors, an inspector, and many head teachers being the editors of individual departments). The review prints 112 pages each month and has 7,400 subscribers. The members of the Association pay only 10 crowns ($2), and they have the right to buy all books published by the Association at the price of production. The Association has now 3,482 members (3,044 teachers, 76 professors, 19 inspectors and 343 associations). In the last year it expended 74,340 crowns

($14,868), and had 77,645 crowns ($15,529) income. The net property of the Association is already 40,484 crowns ($8,097).

The Boy Scout Movement has now spread into Bohemia, chiefly among secondary school pupils in Prague and its suburbs, under the care of Professor A. P. Svojsik, who translated the English work of Sir R. Baden Powell. The volume has contributions also by thirty-one Bohemian men of science (five university professors), and contains 724 pages, with 208 illustrations. To the literature of the Bohemian Scouts Movement five other books have already been added: (1) Bohemian Boy-Scout, (2) Camping, (3) In Nature, and (4) The Art of Observing, all by Professor A. B. Svojsik, and (5) The Meaning of Scouting by Fr. Čáda, Ph. D., Professor of Philosophy in the Bohemian University of Prague. EM. LIPPERT.

SOUTH AFRICAN CHILD STUDY SOCIETY

On November 21st, 1913, the South African Child Study Society was established at the South African College in Cape Town. Its aim is declared to be two-fold: to bring teachers and others interested in childhood to sympathetic and intelligent study of child phenomena, and second, to carry out co-operative and careful investigations into some of the more pressing problems. The society was inaugurated in a large meeting presided over by the Mayor, which was addressed by the President, Mr. E. O. Vaughan, Professor Clark and others, the Mayor being Honorary President. The first publication of the society consists of a "composition inquiry," which after general instructions, proceeds to describe the method of attaining facts depending mainly on reproductive imagery. The children are to read a story told by the teacher, reproduce the substance of a lesson, describe an event, either an incident they have lately seen or heard of, and tell what they thought about it, to describe an incident that illustrates some trait, such as kindness, etc., and describe a scene. The second series of tests are facts depending on originative imagination, and the children are to write a story about a picture or complete a story, criticize one containing an absurdity, write an autobiography of some object or creature. The third theme consists of two expressive drawing tests, the first based on a story told by the teacher and reproduced by the pupils in picture, the second, an original story written and illustrated by pupils.

PICTURES OF PSYCHOLOGISTS

In accordance with the plan suggested in the PEDAGOGICAL SEMINARY some months ago, a collection of about thirty pictures of psychologists has been made by E. A. Kirkpatrick of the Fitchburg Normal School, Fitchburg, Mass.

BOOK REVIEWS

Stammering and Cognate Defects of Speech. By C. S. Bluemel. Two volumes. New York, G. E. Stechert & Co., 1913. pp. vii, 365, 391.

These volumes are the result of many years of systematic investigation of the field which they cover, carried on privately and in connection with research work at the University of Colorado.

The theoretical part of the work is contained in the first volume, entitled "The Psychology of Stammering." The focal point of the discussion, and the author's chief scientific contribution, is his theory of causality. As he states, "the theory has been developed in large part as the result of introspective evidence,—evidence as indispensable as it was uncoveted." (vi.) The introspective evidence has been supplemented by the results of a thorough study of practically all the available literature and with the returns from a questionnaire. The syllabus of the latter, together with the author's own answers to the questions, is given (pp. 238-248).

The devotion, even boldness, with which the author has given himself to his research is well illustrated by an experience of which he gives an account (pp. 130 sq.). "The writer was in the Rocky Mountains, crossing a pass at an elevation of 12,000 feet. A violent storm prevailed. There was a heavy rain, and a freezing wind against which it was difficult to stand. The writer attempted to communicate with another member of the party, and found to his astonishment that his language was completely unintelligible. It was, in fact, the meaningless jargon of aphasia. . . . As soon as the nature of the disturbance was recognized, the writer undertook an introspective analysis of the mental condition. . . . The aphasia disappeared soon after a more protected part of the mountains was reached . . . and as the thought-processes had not been thoroughly introspected, the writer returned—with more zeal than wisdom —to an unexposed position in the pass in order to restore the conditions for the analysis. The aphasia thereupon returned."

The author notes that in the past the phenomena which form his subject-matter have been studied almost exclusively in their physical manifestations. In the present work the subject is considered primarily in its mental aspects. As the book is designed not only as a contribution to scientific theory but also as a guide for those who are subject to the defects studied, most of whom would have no special knowledge of psychology, a brief survey is given of the fundamental principles of general psychology and the meaning of psychological terms. An extended glossary is also given at the end of the second volume, also a bibliography of some 350 titles.

Separate chapters are devoted to the following topics: Mental types (eye-mindedness, ear-mindedness, etc.), the verbal image, the brain, the relation between mental types and voluntary speech, impairment of the brain-centres (aphasia), stammering, mental confusion in stammering, fear and auto-suggestion.

The author examines the most commonly accepted theory of the cause of stammering, namely, that it is caused by delay of vocalization, that is, inability to produce voice. He presents evidence to show that the difficulty is not one of the production of voice as such. His conclusion as to causation is, to quote his own words: "*The stammerer's difficulty is transient auditory amnesia;* he is unable to recall the sound-image of the vowel that he wishes to enunciate. This, then, is the thesis of the present monograph. The stammerer is an audito-moteur. He relies for his speech-cues upon both kinaesthetic and auditory images. When he stammers in enunciating a word, it is because there is complete failure of the auditory image. His futile struggles with the initial consonant are directed solely by his kinaesthetic imagery, but he cannot pass to the vowel because he cannot recall its sound, its peculiar or characteristic quality." (p. 187.) He finds that this explanation "is borne out by practically every manifestation of the defect and every phenomenon connected with it."

Other investigators have conceded that stammering is a form of aphasia, but the defect has usually been regarded as some "obscure and undiagnosable form of subcortical motor aphasia, or ephemia." (pp. 227 sq.) The author presents cogent arguments against this latter theory, and concludes, "The theory of the failure of the auditory image is the only one that satisfactorily explains all the phenomena involved."

In explanation of the relative weakness and vulnerability of the auditory faculties and their greater liability to derangement than, for instance, the motor faculties, the author presents the following considerations, which are of interest to students of genetic psychology. "Hearing is one of the distance-receptors, and is a more recent acquisition in the evolution of the human race. It is one of the later terms in evolution, and hence is one of the earlier terms in dissolution. The motor faculty is phylogenetically the oldest, for the converting of a sensory stimulus into a motor response is one of the primordial functions of protoplasm. The motor function of the nervous organism is therefore the least likely to be undermined. The auditory function, on the other hand, is relatively vulnerable; and it is liable to derangement by even a minor cerebral disturbance." (pp. 231-233.)

"That stammering is an auditory disturbance is borne out by the fact that it does not occur in persons not dependent upon auditory cues. Stammering seems to be entirely absent among the congenitally deaf that have been taught to speak." (p. 234.) "The desideratum in speech is either strong auditory imagery or no auditory imagery at all. The strong imagery renders one immune from speech-disturbances when slight variations in its intensity occur; the absence of the acoustic imagery renders variation impossible. It is the fugacious and vacillating, auditory imagery that causes the stammerer's trouble." (p. 255.)

We are reminded that "the fact that the stammerer is subject to temporary auditory amnesia under particular conditions does not in the least militate against his intelligence. So far as intelligence is concerned, stammerers are normal persons. They probably vary between the two extremes just as do persons of normal speech" (p. 277). Among the stammerers mentioned are Aristotle, Æsop, Demosthenes, Alcibiades, Virgil, Erasmus, Charles Lamb, Erasmus Darwin, Charles Darwin, Moses Mendelssohn, and Charles Kingsley. "With so many of the world's greatest geniuses among stammerers, one might almost regard stammering as an accomplishment" (p. 278).

While the primary cause of stammering is held to be transient auditory amnesia, the author recognizes a number of secondary, or auxiliary, causes, including bewilderment, perversion of verbal imagery, auto-suggestion giving rise to inhibition of the will, and finally, fear. Of the last of these, we are told that it is "perhaps the most important of the mediate causes of stammering. The stammerer's fear is somewhat similar to stage-fright. It takes the form of an all-consuming dread that effectively deprives the speaker of muscular control. . . . It is not merely fear of incurring ridicule, or the fear of making oneself ridiculous; it is rather the fear of 'travailing with unborn thoughts.' It is one of the subjective aspects of stammering that only the stammerer himself can understand" (p. 291). These secondary causes are treated in detail, the conclusion being that they are themselves *effects* of the primary cause. If the latter could be removed, the secondary causes would vanish. Hence "the removal of the amnesia is of chief importance." (p. 334.) Suggestions are given for reducing the trouble as far as possible, but, according to the author, "if a complete and permanent cure is to be effected, the stammerer must cease to be dependent upon auditory images; for, so long as he relies upon these images as speech-cues, he must *inevitably* stammer when amnesia occurs. If it is possible, the stammerer must learn to depend upon kinaesthetic and visual cues" (p. 362).

The second volume contains a synoptical review, with criticisms, of the various systems of treating stammering in Europe and America. The systems cited "have not, as a rule, been given for their sovereign merit. Indeed, many of the systems are entirely devoid of merit; they have been recorded merely because they are gold bricks that are daily sold to stammerers by an infamous fraternity of 'speech specialists.' The wretched systems must inevitably become obsolete with the advancement of the psychological investigation of stammering. But meanwhile progress is hampered by charlatans, who rob the stammerer and bring everybody and everything connected with the treatment or investigation of stammering into disrepute. Manifestly it is incumbent upon stammerers themselves to remedy these conditions" (Preface, p. viii). The methods of treatment are grouped under the following heads: respiration, vocalization and vowel-production, articulation, verbal exercises, modes of enunciation, mechanical appliances; the last chapter, dealing with "stammering schools" and "speech specialists," is one of the most thoroughgoing and startling exposures of charlatanry in literature. The book should be in every school and public library, and should be read by all students of psychology, by parents and teachers, as well as by the many who would personally profit in a practical way by a knowledge of its teachings. As to its central theory of causality, it only need be said that it appears to the impartial reader to rest on a surer foundation of careful and comprehensive observation and critical analysis and interpretation of facts than any other theory in the field. The book cannot be too highly recommended.

A. N. GILBERTSON.

Psychologie der Sprachpädagogik: Versuche zu einer Darstellung der Principien des fremdsprachlichen Unterrichts auf Grund der psychologischen Natur der Sprache. Von CHR. B. FLAGSTAD. Leipzig u. Berlin, 1913, pp. xxviii., 370. Mit einigen Kurzungen und Änderungen vom Verfasser aus dem Dänischen übersetzt. Price, geh. M 5, geb. M 6.

This work is distinguished from others in the psychology of language in that it is devoted exclusively to the practical problems of teaching contemporary foreign languages. On its psychological side it suggests Wundt, but more particularly Höffding. On its pedagogical side it reminds one now and then of Henry Sweet's "The Practical Study of Languages." Like Sweet the author belongs to the conservative camp. He formally and explicitly claims adherence to the Indirect Method of instruction and is not a follower of Gouin. Although the work suggests the influence of other writers in the field, the author is an independent thinker and his discussions are refreshingly original. And his work is a refutation by example of the contention that every kind of language study must needs be conducted on historical lines. It is a systematic study based on the principles of normal psychology. It is the author's view that pathology can throw no new light on normal speech. Nor does he believe that neurology has made any serviceable contribution to the subject, for at least as far as language is concerned there is no agreement in that field on anything that may be turned to practical account in speech pedagogy.

The work is divided into three main parts: first, Word-imagery; second, Language as Expression of a Thought Content; third, Relations of Language to the Whole of Mental Life. The sub-divisions under the first heading are, the nature of sound perception, the speech sounds, word-imagery of sight and movement; under the second, the mechanical structure of language (not the mechanism of speech, which is not taken up), form (inner) and content of language, meaning; under the third, relations of the word to other kinds of imagery, meaning of feeling to language acquisition, the will and language acquisition.

Of the three main parts, the author is at his best in the first two, and the content of these parts is also far more important to the student than that of the last. A reader who is pressed for time could omit the last part without missing the vital and most essential elements of the study.

The author begins his first chapter with the distinction between natural and artificial imagery. The first is based on perception of sound and of movement, the second on words as seen in script and print and on the movement of the hand in writing. To be exact, to the first must also be added the movements of the speech organs and gesture as seen. In one who commands a language on all its sides, all these activities must be conceived of as working together and as leaving their corresponding impressions and imagery. When one regards himself as being a visualist, an audile, or a motile, it must be only in the sense that one or the other of these forms dominates the memory, and not that one or another kind of imagery is independent and isolable. In this the author holds to Höffding's theory of the "psychische Chemie" according to which the sense-impressions and images are not to be regarded as strictly separable but as fusing into new qualities or at least into unities which do not admit of direct analysis. These unities seem by introspection to be characterized by corresponding single sense qualities, but it is only because the other elements which accompany them recede for the time being in the consciousness in favor of the one to which attention is being directed. If the active will element were not added in this way to mere association to produce this unity, language impressions would be one great chaos. On this basal principle the author discusses types of imagery and the interrelations between the different kinds of images, concluding, that for the memory of a sound the connected image of movement is of prime importance and, finally, that *the necessary condition for the union of the sound* *image with the rest of the content of consciousness is its fusion with the images of space, of material, and of movement.* In other words, this is the condition of the permanent retention of the sound image, the condition of acquiring the sounds of a foreign language. Thus the sound impression forms with the connected impressions a complex which it is not possible to disintegrate. This is the fundamental principle on which much that follows in the rest of the book is based.

With Stricker the author regards motor images as an ever-present element in word-imagery, but he attaches an importance to the accompanying sound image not to be found in either Stricker or in Wundt. That the word is an act and that the mastery of this act can be gained only by carrying out the whole act in all its branches repeatedly, is a point of view which the author says must never be forgotten in the pedagogy of language. This principle is emphasized again in the chapter on the acquisition of the language arts, reading and writing. This entails opposition to the view of which Ballet finds confirmation in his study of aphasia, that the imagery of writing is somehow coördinate with sound and motor imagery. Says our author, "We do not write from the visual impression of the script but rather gain our visual impression of the script from writing." In reading, what Höffding regards as the immediate association between the word-sign and the thought the author explains by the theory of the rapid movement of images; so rapid as not to be recognizable as entities. This is his substitute for the imageless thought of the Wurzburg School, for Ribot's latent rôle of motor imagery, and Wundt's theory of dispositions or tendencies. He holds that we always think in images (Anschauungen), which may be accompanied by words or be free from them, rejecting the view of Burkhard that we think in two ways; in language and in images (Anschauungen). In another connection the author supports the view that when speaking begins thinking stops.

But whatever may be the character of visual reading, whether imaginal or not, it is not the means of acquiring a language. The author believes with Sweet that there is only "one method for all." A language is acquired through the natural word-imagery, the acoustic-motor, and not through its "visual appendix," however prominently the visual element may stand out in the consciousness.

Finally, the author lays stress on the value of having the pupil see the teacher speak, but does not go so far as M. Schweitzer, who advocates the addition of facial mimic and gesture.

Under "Sprachmechanismus" is comprehended what one might call the anatomical structure of language as such. Here (to give the contents of the chapters in rapid succession) he ventures a discussion and definition of the word, theorizes on word-individuality, or the tendency to regard a word as a separate, individual entity which we sometimes seek in the consciousness somewhere, which is "on the tongue," perhaps, but slips away before it is caught. Although the word comes to the consciousness as a unit, it is the result of a certain selection and uniting of parts. Then follow, the unity of the phrase, the nature of inflection; origin, theory, and definition of the sentence; the relation between sentence and word, the word in child language, the transition from the association of ideas to the associations of sound, the problem of the translation, and kindred topics.

It would be interesting, if space permitted, to follow the author's exposition of inner speech form (which he prefers to call "Ausdrucksgestalting") the psychology of translation, the methods of grammatical instruction and their dangers.

Meaning has a qualitative moment and a quantitative moment. It is the tendency of a word to arouse definite images belonging to the content of consciousness. The four chief forms of language that the author cites are familiar language, the language of formal intercourse, scientific and technical language, and literary language. It is easier to acquire the language of formal intercourse after acquiring familiar language. The reverse way is unnatural. And the author emphasizes particularly the necessity of doing work in a foreign language in its living, spoken form. A literature that strikes a good average, something that represents the mode of thought of the common people, is to his mind preferable to a literature that has become classic. Progress in language acquisition goes from the concrete to the abstract, that is, from the larger to the smaller complexes of the associated activities of expression.

There is a large and well-selected list of references given, including, with a few notable exceptions, all the recent works related to the psychology and pedagogy of language. It is significant that only one English and one American work is mentioned, the latter published in 1885 and related to the subject under the discussion only in a general way.

This would seem to show a lack of interest among American scholars in a field of vital educational importance not alone for the modern foreign languages but also for the study of the mother-tongue; a field to which the largest amount of time is devoted in the curriculum of the high school and the college. The fundamental principles of the pedagogy of language have never been given any attention to speak of in America. This book is on the modern language side of the subject the most satisfactory treatment that has been attempted. For this and other reasons the book will commend itself to the attention of the American teacher who if he has not kept in touch with the European movement along this line can find here, incidentally, a synthesis of the best European thought on the subject of the last fifteen years. To the teacher who has read widely on the subject it will also be of great value for its suggestive and stimulating exposition of fundamental principles combined with applications and illustrations which a teacher of experience can appreciate. It exhibits in a most conspicuous way the practical value of the psychology of language and the fruitfulness for pedagogy of a non-historical approach to language problems.

FRANK K. SECHRIST.

School Hygiene. By FLETCHER B. DRESSLAR, Ph. D. New York, Macmillan, 1913. 369 p.

This is a clear, concise treatment of the subject. The book covers the field so well that any teacher, rural, city or college, will find in it material which he can and should use in his teaching. To members of school boards and to laymen, it will prove interesting and valuable. Though it is not written for the specialist, he will find the author's treatment of the topics and the bibliographies at the close of each chapter of service. The book is well made and the cuts and diagrams it contains add to the lucidity of the text.

A chapter on Play and Playgrounds brings out their function in education, hygiene and morals. The author shows that we need to take more care of girls in these respects than has been customary.

In line with other investigations showing rural communities and pupils in an unhygienic state, it is also found they are lacking in proper play and playground facilities.

The school ground, the position and construction of the school building, its seating, furnishing, heating, lighting and ventilation are treated in the light of recent investigations, experiments and experience. The chapters on "Toilets," "Drinking Cups and Drinking Fountains" and "Convenient and Sanitary Water Supply" show the nature of these needs and how, even in rural schools, they can be obtained without excessive cost. With the arrangements suggested, rural and village as well as city schools could provide baths. On this subject there is a valuable chapter.

The discussion of Pure Air, Open-Air Schools and Humidity indicates how complex and closely related are heating and ventilation. Healthy pupils, as well as sick, need open-air schools and all should have as much open air as possible. Means are shown whereby one-roomed buildings may have good if not perfect heating and ventilation. The treatment of humidity is probably of more value to the specialist than the general reader who, however, will find it suggestive. Some of the suggestions seem inapplicable to a large number of the schools of the country.

A study of Dr. Dresslar's treatment of Eye Defects, Hearing, Teeth and Fatigue will enable one to detect some pathological conditions. Besides indicating the nature of such conditions, he describes practical tests and apparatus necessary for their application. The author probably does not attach enough significance to the rôle of heredity in eye defects. He points out that if the teeth are saved, it must be between the ages of five and fourteen. Adenoids should be removed early as they prevent the proper development of the teeth. Too much use of baby pacifiers may affect the child in a similar way.

One of the best and most important chapters in the book deals with the "Hygiene of Instruction." "It is good hygiene to make the schoolroom a place of vigorous, earnest effort on the part of every pupil," says the author. To this end the work must be systematized. The pupil must be helped to acquire the time sense, to have a time for everything and to do everything in its time. This may be done, partially at least, by studying with him, by being definite in assignments and rigid in requirement of what the lesson contains. The subject matter must be such as to come within the possibilities of interpretation in terms of his own experience.

The spinal cord and lower centers should be made to do the mechanical and oft-repeated work of life, thus relieving the brain. This can be accomplished by *accuracy* in learning; for the spinal cord will give a true record of such impressions in the returning expression.

The program should be arranged with proper alternation of formal and content studies with liberal intervals of rest. The most difficult work should be given when the pupils are fresh.

Physical hygiene is not to develop specialists, but normal healthy men. This point should be emphasized in athletics.

The chapter on Medical Inspection of School Children, like some of the recent books on this subject, may give the reader the impression that such inspection is of a quality and extent greater than exists here. The need of it is clearly indicated. The author's ideals are good but perhaps Utopian. He has failed to indicate what is to be done for the pupils of the village and rural schools, who form the majority of our school population.

Medical inspection will not lessen the work of the teacher, for she will ever be the first aid to the pupil, nurse and inspector. She should know the defects, diseases of childhood and their symptoms.

Dr. Dresslar's discussion of the qualifications and duties of a school janitor is a valuable contribution to the subject of school hygiene. For this chapter alone, the book is worthy of reading by schoolmen, members of school boards and janitors. The facts show that the janitor should be a man of decided mechanical ability, of good personality, steady loyalty, and excellent character. Explicit directions are given for the proper care of the school plant, including such topics as sweeping, dusting, heating, etc.

Other chapters deal with Stuttering, The Care of Defective Children, Hygiene of School Utensils and Books, Cleaning School Rooms, and Disinfectants. GEO. E. JONES.

BOOK NOTES

Handbook of opportunities for vocational training in Boston (regular college courses excepted). Compiled by the committee on opportunities for vocational training of the Woman's Municipal League of Boston, Education Department. Edited by THOS. C. McCRACKEN. April, 1913. 6 Marlborough St., Boston. 301 p.

The world now requires special training in more and more departments of life, and this excellent work is a very valuable addition to this subject. The first part contains an alphabetical list of subjects taught in the vocational schools and classes of Boston, with the name of the school, age and sex of the students, time of session, etc. The second part classifies information regarding schools, professional (art, handicraft, music, dancing, nurses, teachers, miscellaneous), commercial (including public and private), industrial (for men, boys, girls, women, both sexes, endowed and private, public), and schools for training in the household arts. The third part contains supplementary information, organized opportunities for training for the physically handicapped, also for training in settlements and other social centers in Boston, opportunities for finding employment, homes for students in associations or clubs, classified index of vocational schools and classes, alphabetical index of schools and classes, addresses of schools of college grade. There are also good maps of professional, commercial, industrial and other schools in Boston and vicinity.

The hygiene of the school child. By LEWIS M. TERMAN. Boston, Houghton, Mifflin Co., 1914. 417 p.

This volume, very appropriately inscribed by a former student to Professor W. H. Burnham, "without whose inspiration the work would not have been undertaken," treats of, first, the broader relations of educational hygiene, and then discusses the physical basis of education, general laws of growth, factors influencing it, some physiological differences between children and adults, the educational significance of physiological age, disorders of growth and the hygiene of posture, malnutrition in school children, tuberculosis and the school, physiology of ventilation, teeth of school children, hygiene of the nose and throat, defects of hearing and the hygiene of the ear, hygiene of the eye, headaches, preventive mental hygiene (the nervous child, common neuroses of development, the education of nervous children), speech defects and the hygiene of the voice, sleep, some evil effects of school life, suggestions for a teacher's private library on the hygiene of physical and mental growth. The work contains eight illustrations and thirty-three figures and charts. It is a valuable, up-to-date work by one of the livest and best men in the field.

Introduction to the study of English literature. By VIDA D. SCUDDER. Rev. Ed. Yonkers-on-Hudson, N. Y., World Book Co., 1914. 542 p.

It is indeed no light matter to present the story of the imaginative life of the English nation in 542 pages, and like nearly all the other modern textbooks in the field, this is designed to accompany copious reading of texts. The selective principle is applied severely and the work is designed for high schools and not for colleges or universities. Much stress is laid on matter before Chaucer. Part first describes courses; part second, the middle ages, with chapters on chief phases, literature produced in England, Chaucer, the mediaeval drama and the fifteenth century; part third is the Renaissance, and then follows Elizabethan literature, Sir Philip Sidney, Spenser, early drama, Shakespeare, decline of the drama, Milton, and Puritanism. Part four is the age of prose, Dryden, age of Queen Anne, rise of the novel, Jonson, intellectual and romantic movements; part five, modern England, the new democracy, Wordsworth to Keats, Victorian literature.

School costs and school accounting. By J. Howard Hutchinson. New York, Teachers College, Columbia University, 1914. 151 p.

As to school costs, this monograph treats its purpose and that of the investigation, actual statements, studies of twenty cities, cost per pupil, average daily attendance. Part second, on accounting, describes requisitions, payrolls, various ledgers and financial statements, and the third part gives a model system.

Support of schools in colonial New York by the society for the propagation of the gospel in foreign parts. By William Webb Kemp. New York, Teachers College, Columbia University, 1914. 279 p.

The events that led up to the founding of the S. P. G. are first described and then its work at home and abroad, its regulations concerning schoolmasters. This constitutes part first, and part second is devoted to the support of schools in the colony of New York, its charity school in 1706, its work in Westchester County, Staten Island, Long Island, the upper provinces, its catechising school in the city of New York, and the allied negro schools of the Bray Associates, and finally the routine and curriculum. The support of schools in the province of New York is only one chapter in a vast program of colonial evangelization. The chief motive of the society was to extend Christianity throughout America according to the Church of England. The great desire in London was to stimulate the inhabitants to the self-support of their schools, so that the work of the society might pass on to other places that were in greater need.

Parents and their problems; child welfare in home, school, church and state. Edited by Mary Harmon Weeks. Washington, D. C., National Congress of Mothers and Parent-Teacher Associations, 1914. 8v.

This series of eight volumes by some sixty prominent authors constitutes a thesaurus of literature upon the comprehensive and vital subjects it treats. The titles of its eight volumes are as follows: education for parenthood; physical care; ideals of child training; methods and material of training; school problems; coöperation of home and school, church and state. In a multitude of counsellors is wisdom and the encyclopedic character of this work is its most salient feature. The last volume, for instance, contains no less than forty-six articles on as many different subjects, and while there is a good deal of difference in the merits of the scores of articles that constitute the volumes, as a whole they are an excellent summary of the best things that parents ought to know, and represent a great many different points of view. If we were disposed to criticize we should query the propriety of some of the photogravure full-page cuts inserted in the volumes.

The education of Karl Witte; or the training of the child. Edited by H. ADDINGTON BRUCE. New York, Thomas Y. Crowell Co., 1914. 312 p.

The editor first tells us for whom his book is written, then "Was my son born with extraordinary aptitudes? Does my educational work proceed successfully? Is my son's education finished? He may become a superior man if properly educated. Shall I make him a precocious scholar, and how if he is to be such? Have I the skill to make him a scholar? Objections to the early education of my son. Did he profit from it? Should children be left to themselves up to the seventh or eighth year? How we guarded him against flattery. His toys. Playing with other children. Diet. Moral training. How he learned to read, write, work play. Rewards. How he learned languages, sciences, taste, and how he finally goes to college." This book is, of course, a translation.

Growing a life. By CHARLES EVANS. Chicago, Rand, McNally & Co., 1912. 214 p.

This book, we are told, is born of a desire to serve. It views pedagogy as a life process. The author treats the law of laws, of continuity, mind and force, growth, consciousness, self-activity, righteousness, happiness the birthright, food, stimuli, training, appetite, time, freedom, powers, processes, and the great ideal. It is a vital book, written by a man who has come into close practical quarters with his subject, and it closes with an instructive and economic outline.

The message of new thought. By ABEL LEIGHTON ALLEN. New York, Thomas Y. Crowell Co., 1914. 269 p.

New thought is the culmination of many recent cults, and this volume aims at a clear and distinct statement of the principles of the philosophy signified by the term. The author seeks to set forth the divergence between the new system, orthodox creeds and Christian Science. Some of the chapter subjects are: definition of new thought, origin of the creeds, universal mind in man, man illimitable and unfinished, as a man thinketh, ethics of the creed, voices of the new free thought, the art of living.

The problem of immigration in Massachusetts. Report of the Commission on Immigration, 1914. Boston, Wright and Potter Printing Co., 1914. 295 p.

This is a most invaluable pamphlet, copiously illustrated with photographs, charts, curves, and is one of the most instructive pamphlets that has come to our notice upon this ever more vital topic.

The psychology of management; the function of the mind in determining, teaching and installing methods of least waste. By L. M. GILBRETH. N. Y., Sturgis & Walton, 1914. 344 p.

Psychologists and pedagogues will be interested in this summary statement of one of the masters of the efficiency movement. He has first described the psychology of management; then follow interesting chapters on individuality, functionalization, measurements, analysis and synthesis, standardization, records and programs, teaching, incentives, and welfare.

How to rest. By Grace Dawson. New York, Thomas Y. Crowell Co., 1914. 56 p.

This little book aims to point out practically the restful way of living and to show an intimate connection between the body and the soul. The author treats of rhythmical living, nerves, mental tension, temperament, physical and spiritual tension. She does not attempt erudition but her muse is common sense.

The trial balance and other stories about schools. By C. W. Bardeen. Syracuse, N. Y., C. W. Bardeen, 1913. 229 p.

Mr. Bardeen is the story writer of the school system, and this volume shows that he is improving with years. He writes with a masterly inside knowledge of schools, teachers and their aims, always holds up the highest standards and ideals, and everything he writes is eminently readable. May he long continue!

In freedom's birthplace; a study of the Boston negroes. By John Daniels. Boston, Houghton Mifflin Co., 1914. 496 p.

This is an admirable sociological race study by a most competent and enthusiastic student. The chapters will give an indication of its scope;—slave, patriot, pioneer freeman, a race delivered, equal rights and public favor, reaction, the negro forced upon his own resources, taking root, social construction and ethical growth, the upward struggle of the negro church, the ballot, economic future, the future of the negro people. There is an appendix, and statistical tables follow. The author was for years a very efficient secretary of the Congo Reform Association and his book is in some respects a model of its kind.

Oklahoma civics and history. By Charles Evans and Clinton Orrin Bunn. Oklahoma City, Bunn Bros., 1913. 244 p.

This is an interesting hand-book to give students a knowledge of federal government in general, and it is designed to be fitted to school, pupil, teacher and home. It contains quotations, illustrations, songs, and earnest language to incite patriotic fervor, embraces new history, is designed for a four months' course. It treats the evolution of society, family, school, district, town, voting, party machinery, county, village, city, state, and its sovereignty, the nation, insular possessions, diplomatic service, state land department, court procedure, the flag, and finally Oklahoma history.

Rural schools of Canada; their organization, administration and supervision. By James Collins Miller. New York, Teachers College, Columbia University, 1914. 236 p.

There has certainly been a quickening of national consciousness in Canada in recent years, which is the natural outcome of the remarkable development of the past decade. This work surveys the educational systems of Canada in their relationships to rural education, treating of financial support, teachers' courses, attendance, buildings, conveyance, advanced classes and outside agencies, including agricultural. Part second is devoted to inspection and supervision of rural schools, appointment of inspectors, duties, conditions under which they work, improvement of inspectors.

The church, the people, and the age. Edited by Robert Scott and Geo. Wm. Gilmore. Annals and summary by Clarence Augustine Beckwith. N. Y., Funk & Wagnalls Co., 1914. 571 p.

This book is composed of contributions by perhaps one hundred prominent men in answer to a circular letter asking why so many are indifferent to the church, whether it is wise to ask most people to subscribe to statements that deal with controverted questions, what should be the basis and direction of a fundamental theology of the church. The replies are grouped, analyzed and summarized, but it must be confessed that there is such diversity of opinion that, interesting and valuable as the work is, it can hardly tend to advance anything like a consensus of opinion upon the subjects dealt with.

Laboratory manual for human physiology; experimental studies in hygiene, sanitation and physiology. By CARL HARTMANN. Yonkers-on-Hudson, World Book Co., 1914. 144 p.

This manual is prepared for use with Ritchie's "Human Physiology" and its goal is simplicity. The work is planned for half a year. The apparatus is made as simple as possible, and there are plenty of exercises as the work proceeds. It contains 27 cuts, mostly of very simple physiological and biological apparatus, drawn in a way to illustrate their use, which the student is supposed to manipulate.

Pillars of society. By A. G. GARDINER. London, James Nesbit & Co., Limited, 1913. 354 p.

This is a very interesting sketch of forty prominent men and a few women, all alive to-day or until recently, from the most diverse walks of life, most of them accompanied by a photograph. The range of selection will be seen by the following names: King George V., Kuropatkin, Sarah Bernhardt, Carnegie, President Wilson, Mrs. Humphrey Ward, Patrick Geddes, Forbes-Robertson, Roosevelt, Lord Strathcona, James Bryce, and H. G. Wells.

For girls and the mothers of girls; a book for the home and the school concerning the beginnings of life. By MARY G. HOOD. Indianapolis, Bobbs-Merrill Co. 157 p.

This work contains 28 chapters, of which the following will give an indication of its scope; how plant and animal life begin, the egg, germ cell, mammals and their young, the egg and ovary, reproductive organs, pelvis and its organs, how the ovum finds its way to the uterus, how cells grow and multiply, how the pollen unites with the ovule, fertilization, conception and motherhood, development of the human embryo, provisions for the growth of the human infant, birth, feeding, menstruation, how the girl should keep well, hygiene of the menstrual period, exercise, cleanliness, moods, emotions, friendship, marriage, parenthood. The work is far from being medical, has a few copies of famous paintings, and is somewhat sentimental in the sound sense of that word.

The correlation, unification or synthesis of chemotherapy and psychotherapy. By Henry S. Munro. (Reprinted from the American Practitioner, New York, Nov. and Dec., 1913.) 31 p.

The principle of relativity in the light of the philosophy of science. By Paul Carus. Chicago, Open Court Publishing Co., 1913. 105 p.

The Massachusetts home-project plan of vocational agricultural education. By R. W. Stimson. Washington, Govt. Printing Office, 1914. 101 p. (United States Bureau of Education, Bulletin, 1914, no. 8.)

Fifty-ninth annual report of the board of education of the city of St. Louis, Mo., for the year ending June 30, 1913. 638 p.

The diagnosis of the higher grades of mental defect. By Walter E. Fernald.. (Reprinted from the American Journal of Insanity, vol. LXX., no. 3, Jan., 1914. pp. 253-264.)

Semi-centennial history of West Virginia. By James Morton Callahan. With special articles on development and resources. Published by the Semi-centennial Commission of West Virginia, 1913. 593 p.

Instituts Solvay; Institut de Sociologie, Bull. No. 30. *Archives Sociologiques,* publiées par Émile Waxweiler. 5e Année, Fév. 1914. 353 p.

National Education Association yearbook and list of active members. Revised to December 31, 1913. Salt Lake City meeting. (N. E. A. Bulletin, Feb., 1914, v. 2, no. 3.) 386 p.

The policy of the state in determining the qualifications of her teachers. By Thomas E. Finegan. Albany, University of the State of New York, 1914. 19 p.

Mother nature and her fairies. By Hugh Findlay. Syracuse, N. Y., C. W. Bardeen, 1913. 130 p.

Teaching of mathematics. By Raymond E. Manchester. Syracuse, N. Y., C. W. Bardeen, 1913. 75 p.

Introduction to the study of English literature; from the earliest times to the close of the Victorian age. By W. T. Young. New York, G. P. Putnam's Sons, 1914. 238 p.

Experimental psychology and pedagogy. By R. Schulze. Tr. by Rudolf Pintner. New York, Macmillan, 1912. 364 p.

This book is written to introduce experimental methods in psychology and pedagogy to a wider circle. It lays no claim to completeness. Its matter might be arranged according to apparatus, to methods, or the chief divisions of pure psychology. The latter is chosen and the author follows Wundt's terminology. Hence Chapter I is on the mathematical treatment of results in child psychology and pedagogy, dealing with measurements in physics, the error and mean, measurements in biology, Gauss's law, measurements in psychology, child psychology and pedagogy, changes in asymmetry, etc. Chapter II deals with measurement of sensation, the threshold, variation, methods of limits and differences, the analysis of one sensation, viz., touch, Weber's law. Chapter III deals with perceptions and ideas, space, time, and statistics of ideas, analysis of the child's store of ideas with the help of speech and drawing and modelling. Chapter IV is feelings, how to observe them, investigations of the symptoms of outward expression, investigation of pulse, pressure and volume, outward expressions by speech, drawing mimicry and pantomime. Then comes the will, beginning with time error and reaction experiments with the graphic method, method of insertion, muscular, sensorial and natural reaction, and then consciousness and attention, assimilation, memory, perceptive combinations, speech, physical work, starting from the ergograph, mental work, psychical correlations. The book contains 314 cuts of instruments, curves, etc.

Education and psychology. By MICHAEL WEST. London, Longmans, Green, 1914. 341 p.

This book attempts a simple outline of psychology as applied at every point to the problem of schooling, but is primarily intended for a larger public than the school, and hence is untechnical. It points out psychological errors which lie at the basis of present educational systems. The work is divided into five parts. The first deals with meaning, scope, method of psychology and of the nervous system and fatigue. Part two deals with attention, sensation, perception, memory, intellect, and technical subjects. Part three deals with the imagination, liberal topics; part four, feeling, instinct, language and the self and its expression, and part five with education for action, the boy, the schoolmaster, the school, the alternative. The author evidently assumes to be original. The writer of this note has not found a single reference to another authority in it, and it is a little difficult to understand what the real *raison d'être* of such a book is, so that the question arises whether in attempting to be elemental the author has not been simply commonplace.

The purpose of education; an examination of the education problem in the light of recent psychological research. By ST. GEORGE LANE FOX PITT. Cambridge, University Press, 1913. 83 p.

This book treats human personality, emotion and instinct, character versus reputation, incentives to effort, economics, specialization, multiplex environment, religious ideals, and twice-born.

Natural history of the farm. By JAMES NEEDHAM.

This interesting and rather novel book is divided into three parts. The first is for the fall term, from October to January, describing Mother Earth, the wild fruits and nuts of the farm, its stream, fishes, pasture, plants, wild roots, deciduous trees, woodlot, fuel woods, winter verdure, wild and domesticated mammals, landscapes, with optional individual exercises, a student's record of farm operations, noteworthy views, trees, autumnal colors, a calendar of seed dispersers. Part two, for the spring term, describes the lay of the land, deciduous shrubs, winter activities of wild animals, fibre products, ice, maple sugar, soil, passing of trees, the fence row, spring planting, a cutover woodland thicket, spring flowers, apple blossoms, bird songs, also with exercises. Part three, for the summer term, deals among other things with clovers, aromatic herbs, trees, woods, flowers, insects, rain, vines, swale, brambles, old apple trees, swimming holes, winding roads, etc.

How man conquered nature. By MINNIE J. REYNOLDS. New York, Macmillan, 1914.

This little booklet in the Every Child's Series describes the first manufactures, the beast-farmer and his helpers, how man got the food plants, the story of man's clothes, what the mineral world furnishes, man as a servant, the machine, the growth of civilization through money, trades, tools, the conquest of all, why our race has conquered, the quest in the future. The book has a very few illustrations, most of which, to the mind of the writer of this note, rather detract from than add to its value. Some of them certainly are not well chosen and all are poorly executed.

Ethik als Kritik der Weltgeschichte. Von ALBERT GŐRLAND. Leipzig. B. G. Teubner, 1914. 404 p.

After a long introduction describing philosophy as idealism, realism, criticism, and the relations of logic and ethics, the author discusses the problems of ethics that arise from the separation of social sciences. There are here dangers of limitation from hedonism, historism, mysticism, economy, self-consciousness, the State, community, etc. The second part of the book, entitled systems of ethics, deals first with the basal law of truth, then the freedom of the will, economic society, with very many discussions of social themes.

Das freie literarische Schaffen bei Kindern und Jugendlichen. Von FRITZ GIESE. Zwei Teile. Leipzig, J. A. Barth, 1914. 242 p.

This is the second part of a very comprehensive study of literature by children, of which a copious collection was first made, and the work consists in first describing the method and material and then treating the form, theme, *Stimmung* and character, the factors that influence juveniles to write poetry, an analysis of single specimens, differences in sexes, in age, and finally, eroticism.

Special method of instruction. By FELIX ARNOLD. Volume 0, Develment, chiefly visual. New York, S. Mandel, 1913. 416 p.

We here have an interesting compend of methods in arithmetic, reading, physics, speaking and dictation, composition, language forms, geography, history and nature study. The work is designed to aid teachers in their daily practical work.

Commercial education in Germany. By FREDERIC ERNEST FARRINGTON. New York, Macmillan, 1914. 258 p.

This admirable compend treats first of Germany and its educational system in general, then of the lower commercial schools, which topic is treated with greatest detail. Then follow chapters on secondary commercial schools, the colleges of commerce, with appendixes on apprentices' indentures and lessons in commercial English.

A CORRECTION

The publishers have called the attention of the PEDAGOGICAL SEMINARY to an error in reviewing the English Grammar by William T. Harris in the last number. The review was written under the assumption that the author was the late Hon. William T. Harris of the Bureau of Education, which is not the case. He is another man of the same name.

THE
PEDAGOGICAL SEMINARY
Founded and Edited by G. STANLEY HALL

VOL. XXI SEPTEMBER, 1914 No. 3

THE CHILD GOD

By LOREY C. DAY, Baldwinville, Mass.

You may know of Mars and Venus and many other worlds, but I doubt if you ever heard of Exlose. It came out of darkness, shone forth gloriously a few years, and then disappeared. Exlose was an imaginary world and I was its god. Every child is at one time a god. He is the supreme ruler of an imaginary universe. He creates and dominates a world of make-believe geography, make-believe people, and make-believe institutions. He is the First Cause of everything. No river flows, no person speaks, no institution acts, without his willing sanction. Yet he is not a proud god, for he lives among his people and they are all friendly and intensely real to him.

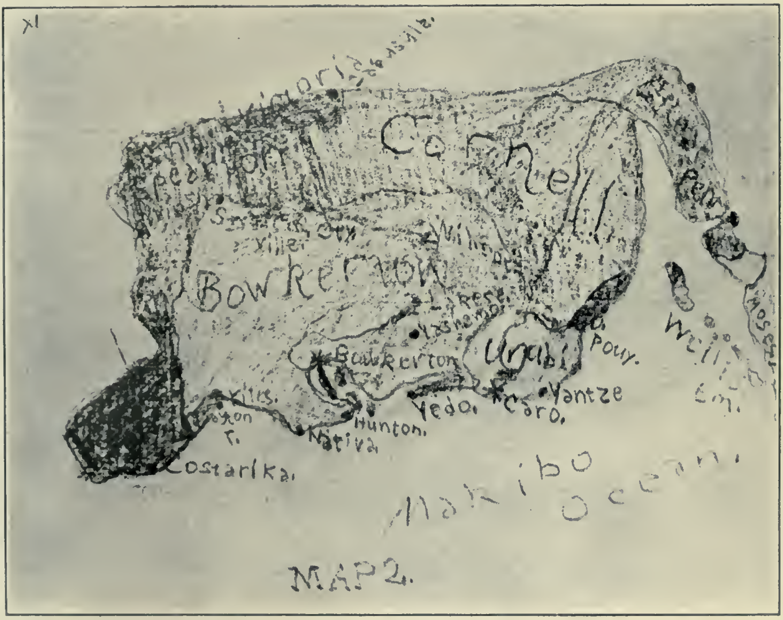
The history of Exlose is not unlike that of Earth. There was an age of Chaos, of War, of Industrialism, and of Decline. Mine was no paradise of kind fairies and special favors. Everything was cold and material, and followed worldly law. From chaos arose no supernatural creation of order, for a systematic unity was a slow evolutionary development. There were no miracles of battle, and victory and fame were attainable only through hard work. Industrialism's progress was gradual and continually beset by war; while even decline followed the natural trend, there being no quick doomsday extinction, but merely a steady scientific disintegration. Down to its finest detail my Exlose reflects its earthly origin—I lived in a materialistic household, read realistic literature, and followed the newspapers closely. Exlose presents the real world as it seems to the small boy. It is a kind of imaginative revision of real society.

I was a god with a strong bent for printing and drawing—an editorial god, as it were—and many of my greater activities are preserved as news and sketch in a small hand-printed newspaper. I entered upon the chaotic era at six, while the Spanish-American War was in progress. Maps show the world to be one-sided, flat, and egg-shaped, with my home village at its center, a few nearby towns clustered about, and with "Cabu" (Cuba) set apart in one corner. The land was shattered by peninsulars and gulfs into octopus form, and was entirely surrounded by an ocean of swirling lines. This map often changed. Sometimes a thin rim of "U. S. A." encircled the nearby towns, and both land and sea were constantly shifting about. Generally skyless and weatherless the world would from time to time be set adrift in space among clouds, moon and sun after the careless manner of school geographies.

After Chaos came War. Every boy is more or less a warrior, but the military idea was particularly strong in my group, because of the Spanish, Boer and Boxer conflicts. There were few robbers and pirates among us, for all our energies were absorbed in battle. Slowly the Exlose world developed two distinct aspects, real and imaginary. The real was physical, the imaginary of course mental. The real consisted of wild charges across the fields, the imaginary of scribbled maps and feverish news items. The real was known to all the neighborhood, but the imaginary was a secret between myself and my paper's one subscriber—a gray-haired aunt. A few of my warring comrades, however, discovered our secret, for I was always naming the hills and trees, and allotting fictitious titles.

First campaigns were rather spasmodic, but organization developed rapidly. Each boy was equipped with a wooden gun and, sometimes, with sword, pistol, belt, and camera-box, for lunch. The up-hill bayonet charge was the most popular form of activity, and eating was in high favor when resting in camp. Boys were usually all on one side, with every one an officer, and combating a common make-believe enemy. Two real sides were exceedingly dangerous. There was only one serious two-sided engagement, and that resulted in many bruised faces and the practical demolition of an abandoned horse-car, which played the rôle of ill-fated fortress.

Small realities were the stimuli which set going a large imagination. A good-natured afternoon skirmish became in my paper a battle of this kind:



Continent No. 1

(Maps taken from 1st and 2nd editions of "An Atlas of the Exlose World.")

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BATTLE OF ZOX.

Sept. 29.—Gen. Day with 35,000 men captured Zox and 4,000 men. Losses are A. S. 23 killed Kingsure 24 killed A. S. woned 17 Kingsure 18 wounded.

The battle of Zox was the most interesting battle ever known.

In the Battle 45 shells used.

In the Battle was 25,000 bullets.

The first prisoners were taken in the battle of Zox.

It was the first (time) Day's wonderful canoon was used in the battle of Zox.

A more decisive victory was at Grange in the war with the F-L's:

BATTLE OF GRANGE.

Grange, City., Dec. 7,—Specail telagram at 5:30.—The soldiers of our country have done good work and have beaten the F-L's and killed 500 and wounded 178 and 25,000 have surrendered. For a while the air was so full of shells that you could hardly see. The F-Ls only killed 120 of our men and wounded 25. None surrendered.

Signed, Gen. Day and Gen. Den Witts.

Gen. Day had 29,000 men and Gen. Den Witts had 15,000 men.

Ceaseless warfare naturally gave rise to many diplomatic bickerings. My paper frequently published "secret" letters to Gen. Day, coming from the enemy's camp or from some friendly allied ruler. King Lap-tet of Un Se Bal sought to aid me by imparting this valuable geographical information:

Dear Friend; Sept. 17, 1900.

The name of that Blue contry is Fattleland population 100,000,000. Kingsure Islands are called Hailers Inland population 5,000,000. That pink contry is Linkland population 7,000,000. Them 3 yellow contry are called Liten population 4,000.

Yours truly,
King Lap-tet.

Less studied, but more important, diplomacy was necessary to keep the real side of my world in harmony. There were three of us who had become actively interested in Exlose and, to keep peace, each became a president, and whenever we entered battle it was as allied generals with equal powers. We formed a sort of Triple Alliance whose aim was to keep the whole imaginary world in subjection.

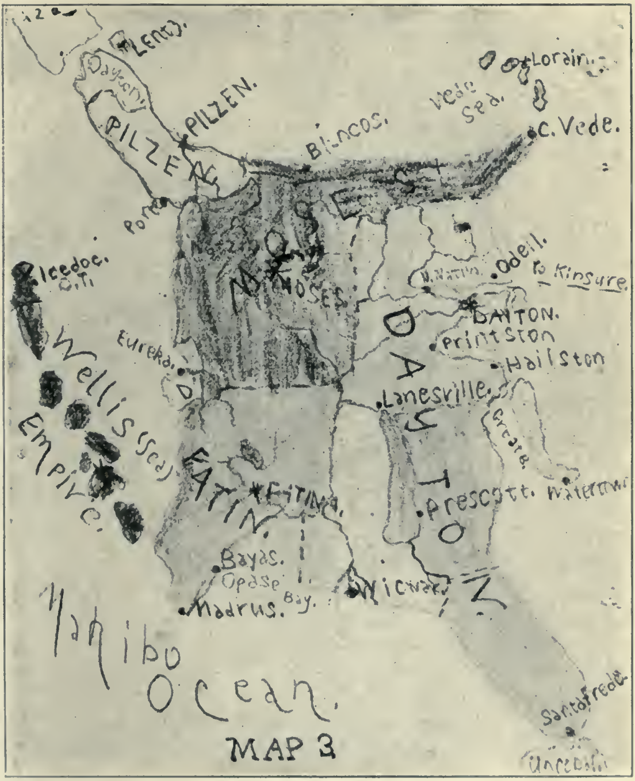
My active militarism was soon to fall prey to imaginative red tape and detail. Under the influence of the United States census of 1900 I became seriously addicted to the use of statistics. Everything on Exlose—area, population, armies, navies—was reduced to tabular form. Half the interest in a battle was the difference it would make in population, and victory was heralded with joy chiefly because it added a few square miles of territory—not that the territory might be valuable, but because it was a few square miles. A new battleship was important not because of the added naval power, but because it had so many smokestacks, portholes and officers. And the most essential thing about a new ally was its flag and uniforms. So long as the flag was multi-colored and the uniforms gay victory did not matter, or would come of itself.

With such attention to detail the means necessarily came to obscure the end. Finding an unlimited field for action in statistics, imagination waxed strong and, finally, the physical side of Exlose was overwhelmed completely. There were no more garden skirmishes and up-hill charges; every battle now took place on paper, and the face of the world was changed at will in the comfortable quiet of my study.

The rough maps showing my village as the center of the world represent the chaotic era. During the military period these maps underwent a complete revolution. The real towns, U. S. A., and even Cabu disappeared entirely, giving way to new, make-believe countries. Earth was cast aside and Exlose entered upon an independent existence. Exlose at first was a mass of islands, with each island a country or province. It is in this island stage that the first great wars take place. But, gradually, under the influence of real-world geography, small continents appear, and on the east coast of one rises the confederacy of "American States," better known as simple " A. S." The capital city is " Printston," and its ruler is the militant President Day.

Around A. S. in nearly every direction were hostile countries, and the President was forced to conquer or be conquered. He directed campaigns in three directions, north, south and inland. To the north he was engaged in a series of bloody wars with Kinsuer, inland with Moses and Fatinland, and to the south with Grenoe and a half-independent union of three large states, Un Se Bal, Mispolie and Lisyvinsue. The northern Kinseur territory was won after a series of land and naval victories, all equally terrible. At last the unfortunate country was thoroughly humbled and, flushed with success, I led my army across the sea to the very gates of the venerable capital city of Czarinae. Moses went down in easy defeat, and was forced to give up half its lands. Fatinland was less easy, my armies being repulsed upon several occasions, but there finally came a sweet revenge when I advanced by river to the gates of the royal palace at Fatima, where I forced the cession of vast territories and the royal city itself.

In the south I encountered more resistance. The south, in real life, was the back yard, and opportunities for fighting



Continent No. 2

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there were unlimited, and unhampered by peace-loving neighbors. So it was that Grenoe was last to submit. I met defeat after defeat and sometimes as many men were "killed" on my side as on the enemy's. When I gained victory, however, it was decisive, and offset all previous defeats. One after the other Un Se Bal, Mispolie, and Lisyvinsue fell or, in terror, became my ally; I captured the Shantung peninsular and the fine city of Santefredo. Then the enemy entrenched itself about Wicwar for a last stand. Wicwar was a magnificent city at the mouth of the Prescott River, which flowed through the very heart of A. S., and of course was a highly desirable prize. Situated on a delta the city was hard to approach, but at length my ships and army made a full circle, there was a long siege, and Wicwar fell. Grenoe itself, shorn of all its dependencies, was next attacked—as usual—near its capital, but peace was quickly secured through the cession of Wonderland, a rich peninsular abounding in ores, minerals, and forest products. Later there were short wars for distant colonial strongholds, but the siege of Wicwar marks the practical end of the military era. A. S. had added twenty times to its original area, several million people, and untold wealth.

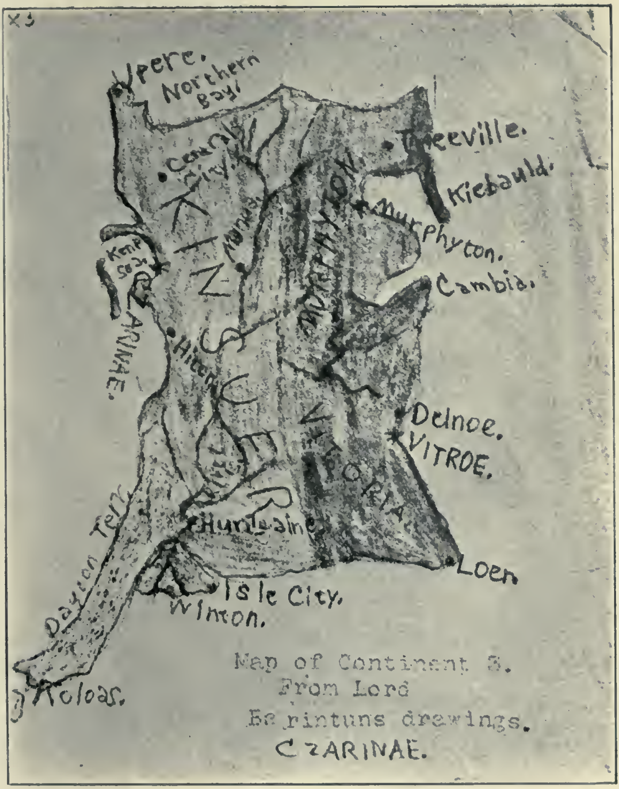
With no more desirable nations to conquer, the warring president sat back in his editorial chair to plan out an industrial régime. The map was in sad disorder after so much turmoil, and the first step was to establish Exlose on a systematic basis. Continents were reduced to four, with several scattered islands. Then each continent underwent a slow revision. Rivers began to flow in fixed courses, and bays, capes, and all natural features were given a permanent position and a name. Countries were marked off, some with states, and each with a capital city and several lesser towns. My home continent—Continent Number Two—was naturally the most highly developed of the four. A. S., as a name, was superseded by the more egoistic "Dayton," state lines carefully drawn, and cities located at convenient distances. Most of the first cities were sites of famous battles, but as industrialism grew, new cities grew to meet its demands. A play railroad—in reality a hundred yards along the street—was transferred to the map. This railroad, with its branches, demanded the creation of several new towns—and so Beville, Hailston and Chesterfield grew up about Printston. Other routes were imagined and put onto the map, and Kingsbury, Lanesville and York appear. New industries, mineral and oil discoveries, forest areas, farm lands, all came in season, and then arise the "boom" towns of Yava, Farmington, Gold City and Maculay. There were about a dozen states, and each was blest with a name—Clifton, Mendoceno, Odell, Cornwall and Mantobia were the leaders. And even the railroads did not escape the naming genius—observe the B. & H., Daisy, Clover Leaf, Merchants, Fruit, and the K. & Q.

Every name is reflective of some one or more influences, and all together are significant of the breadth of my experience as a small boy. Beville, Lanesville and Yava can be traced to home experiences, Mendoceno and Cornwall to geography, and Odell and Maculay to my literary acquaintance with great men. My total name creations number over a hundred, and each one is traceable to its source. Some are plagiarisms pure and simple, some are corruptions (conscious or unconscious), and some are inventions built out of old names or from syllables jumbled in play.

Many of the cities were very real to me. Wicwar, vaguely associated with New Orleans, I fancied as a great delta city with wharves and ships, immense warehouses and business blocks. My imagination had surrounded Wicwar with a deal of fine sentiment and, as president and railroad magnate, I often visited there. A peculiar combination of associations explains my favoritism. In real life the city was a certain spot in the garden, its war-scarred history gave to its past a decided glamor, and even the name itself was bound up in pleasant experiences—Wicwar being a conscious variation of Warwick, the name of a small hamlet where I had been several times with my mother.

Printston, my home city, was teeming with life and action. There was a great harbor guarded by impregnable forts at its entrance, and through the city ran the historic Grange River, furnishing generous water power to the factories along its way. Many of the streets were named, and four or five skyscrapers and public buildings were well developed as regards detail of size and arrangement. My newspaper was housed in a splendid five-story structure of brick and granite, situated at the corner of Wabash Avenue and Cross Street, and backing on the river, which furnished power for the presses and other machines. Besides an editorial staff, there was a group of half-imagined employees. I treated all with great kindness, but my best friend was the night watchman, with whom I often chatted familiarly night and morning, while in bed.

The railroads at Printston were of especial attraction, and I frequently rode on the trains out into the country, taking charge of the throttle to relieve some tired engineer. The goal of my journey would be one of the older sentiment-laden towns of the Wicwar type, such as Beville and Hailston, the first two industrial centers, Grange, site of the great battle,



Continent No. 3.

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and Chesterfield, a terminal of the first railroad. Saturday nights I planned an unusually delightful trip. My paper was then distributed from a special train to which was attached a private editorial car. Sometimes this private car was my bed, and the wild imaginative joys peculiar to the Saturday night ride no doubt arose from the very real anticipation of a long Sunday morning sleep.

I saw to it that Dayton was ever supreme in population and wealth, but I was generous in extending organization and names to the rest of the continent. The shattered remnants of Moses and Fatin-land were both put on industrial bases; new cities arose to meet the new industrialism. Pilsen, a third country, in the northwest, was similarly developed, and its commerce was facilitated still further by the construction of two long canals.

Continent Number One, associated somewhat with Asia, and the largest of the Exlose land areas, lay to the westward of Dayton and Continent Two. Its chief occupant was Bowkerton, under the rule of a real boy, Bowker, who had generously contributed the whole continent, both in reality—a field —and in imagination—a map. Bowkerton, too, was rapidly spread over with railroads and towns. The capitol, Hanover, was a coastal city with a million inhabitants and comparing favorably with Printston. Rimming the northern and western borders of the country were several minor states and kingdoms. Spearton was a small, half-real republic with a flesh-and-blood president; Victor-Vitoria was a dual monarchy having only an imaginary existence, and peopled by a north European-like race. Cornel, associated with Russia, was the humble remnant of a mighty country which had formerly occupied most of the continent. Cristina, Hibernia and Orubia were three small republics that had revolted from Cornel.

Extending away from the southeast coast of Continent One, and partly parallel to the west coast of Continent Two, were the Wellise Islands. The northernmost of these was Icedoc, seized by Dayton in an early war with Cornel. The other islands, six in number, comprised the Wellise Empire.

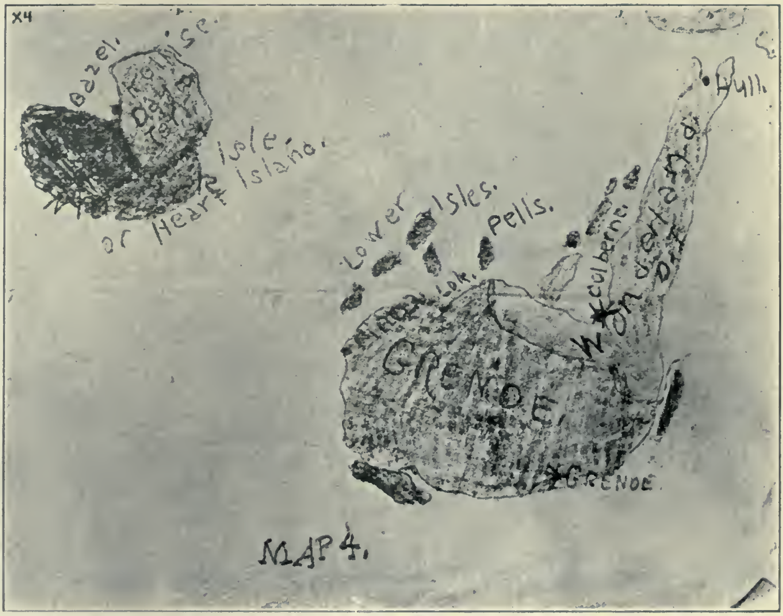
The greatest of the make-believe powers was my sometime enemy, Kinsuer, represented in truth as a field directly opposite my home. Kinsuer occupied Continent Number Three jointly with another half-real republic, Murphyton, which was under President Murphy of the diplomatic Triple Alliance. A small central area—Chinaton—was under the protection of both governments, and a southern peninsular was under Dayton rule. The population of Kinsuer in its last census was 41,116,635, its capital was the ancient Czarinae—once threatened by General Day, and its last ruler was the benevolent King George. Kinsuerian culture was in a vague way like that of western Europe, and the entire Third Continent lay in an easterly direction from Dayton, with Czarinae and Printston bearing a relation to one another comparable to that of London and New York. The northern coastline was broken and rocky, and associated with Scotland, while the south was semi-tropical, often swept by wind-storms, and in its geography reminiscent of Greece and Italy.

Southwest of Kinseur and directly south of Dayton was Grenoe. Its people were wild and Chinese-like, while its general map outline and position resembled closely Australia and, like Australia, it was sometimes considered as an island, sometimes as a continent—Continent Number Four. In later times, after Dayton had succeeded in conquering and annexing its more desirable northern territories and islands, Grenoe settled down as a peaceful, progressive nation, and its last monarch, Emperor Wilum IV, was a great educator and very friendly with President Day. It was a universal law that, after the loss of the best land and thriftiest people to Dayton, a country became happy and prosperous, and was everlastingly grateful to its greedy benefactor.

Harte Island, a part of Grenoe, and half the size of the mother country, was the afterthought of a guilty conscience. When Grenoe was at the low ebb of its fortunes, I hastily created this island in the midst of the Makibo Ocean, hoping that perhaps this new territory would at least partly make up for the old I had taken by conquest. Yet there was still a germ of selfishness in this charity, for a portion of the new island was later utilized as a Dayton colonial station.

A second afterthought was Sargwine. A great vacant place in the southern sea demanded another island to balance up the world's land surface, and Sargwine was the fulfilment of this demand. In shape it resembled Cuba, but in position and natural endowment it was more like the Philippines. For a short time upon " discovery " the sole occupants were a few faint-hearted wild blacks, who were easily overcome and subjected to the salutary colonial rule of Dayton. Aggressive Daytonians found rich gold mines and many rare stones, and a providential supply of coal was just sufficient for passing trade ships.

The Adle and Adalia Islands were two A-shaped groups in mid-ocean between Continents One and Two. Both were semi-tropical and populated by a half-civilized brown race. Adalia was fairly high on the scale of progress, and its ruler, the Duke, was a friend and fellow of all the kings and presi-



Continent No. 4

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dents in Exlose. During early days there was much fighting in both Adle and Adalia but peace soon came to reign under a strong Duke and, for some unaccountable reason, Dayton never molested him save quietly to negotiate for an open port on a northern island.

This world with such a perfect organization possessed one very serious geographical flaw. It had no equator. Exlose was round, it had a north and south pole, continents, oceans, rivers, everything essential to the welfare of a good world, except an equator. There was a central line of course, but it was not considered an equator, and bore no relation whatever to the sun. The sun followed only the south pole. There were no complications of sunshine and climate on Exlose. There was a plain north and south, with the north cold and the south hot, no matter which hemisphere you chose. The north pole was like Earth's, but the south pole was tropical the year round. Exlose was the product of the northern hemisphere and to the last remained true to its producer. There were no southern heresies such as snow in July and harvest in January.

Of the four hundred million people on Exlose only a small group became more than a mere "public." Personality was a privilege reserved for the very select few. I was much in the society of kings and warriors but I did not regard them as particularly real. General Hay was the only national hero that I endowed with personality and character. He directed many of my campaigns and we were often in conference. He was an elderly man with wide experience and superior wisdom; he was courageous, unconquerable and never known to lose a battle.

An era of war is no time for friendships, but with peace and the rise of industrialism I created a number of imaginary men and women. Most of these later characters were journalists and artists, and they represent the final triumph of the calm editor over the warring president-general. James Howe, the first of the later creations, marks the transitional stage—he began life as plain James Ow, an officer in the Kinsuer wars, but with peace he changed his name and joined my editorial staff. He served as a kind of business manager-reporter, though his duties were rather ill-defined. To Mr. Howe can be credited such frank exaggerations as this:

> The U. S. JOURNAL M. B. Carcaltion (circulation) in August was 126,257. in July 114;322 June 103,501 May 94,0000 April 87,220.

He is also responsible for purchases of this nature:

> 2 New Presses 3 boiders (boilers) 892,000 tipe 178 balls of paper. TOTAL Press $200 Paper $85 Tpe $10 Boiders $250 (Total) $545.

Mr. Howe had a son, Jimmy, who was quite as important as his father. When Mr. Ow enlisted in the army, Jimmy was left behind alone and, out of pure kindness of heart, I took the boy into my office, giving him board in return for whatever he might write for the paper. He chose to write weekly letters, in simple straightforward narrative, treating upon the commonplaces of a small boy's life. After a time Jimmy tried to become a humorist through the easy and often ineffective method of bad spelling, and in his later communications it is obvious that he had read Shute's "Real Diary of a Real Boy."

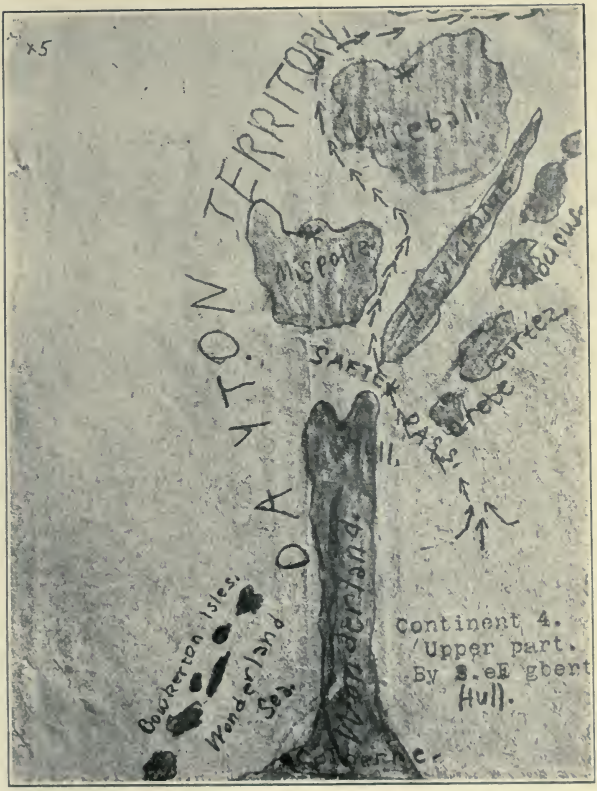
Two notable artists contributed pictures for the paper: Mr. J. J. Jackson furnished maps and sketches, while Mr. William R. Ross drew the comics and more finished illustrations. Jackson was early discharged or forgotten, but Ross continued his work for several years; he was intrusted to make new typographical arrangements, to invent new type faces, and to decide upon color schemes. In fine, he was a personification of the artistic side of my nature.

Various make-believe people, men, women and children, sent brief letters to the editor. Many of them told how well they enjoyed a certain new department or feature. One juvenile department, "J. L. O.," presents this letter-writing habit at its worst, for each week the whole J. L. O. page was devoted to letters telling how the writers delighted in the department the previous week. I tried to imitate the "experience" letters of the Sunday newspaper juvenile pages, but I succeeded in producing only testimonials of artless self-praise. Other correspondents dealt with weighty social problems, as did Miss T. O. Jinks, who takes the palm for keen social insight:

> Why Mary I think I will have to marrie about June 2, 1865. Yes I agreed. We wont qurriel like other people do. after they marrie their saying stop reading the news Oh do stop But we won't do that will we John. Oh, Corse not I won't do that. But they did when they married.

The Miss Jinks of real life was my aunt, who had been happily married nearly fifty years, but who was still skeptical about matrimony.

As publisher I had to buy imaginary printing supplies (through Mr. Howe, of course), and for this need several imaginary business houses were established. These houses were only half personal. I transacted business with the make-believe owner or manager, but my chief interest was in the purchase and payment. I patronized most the King Engraving Company, situated across the river from my office build-



CONTINENT NO. 4
(Upper part, showing islands between Conts. 2 and 4)

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ing in Printston; the Arlington Paper Company and the Oldberg Ink Company were two other friendly concerns. Oldberg was a city name and entirely impersonal in its associations, but Mr. Arlington of the paper company was at one time active in Dayton politics as a senator, and I often called him in to act as presidential advisor in perilous crises. There were other people but none were so vividly realized as these. I occasionally made out a cabinet list, consulted a governor or mayor, or praised an explorer, but few had names and none had well-developed personalities.

There were times when a wife moved dimly by my side. She had no particular name, and it would be absolutely impossible to describe her. In a vague way she was kind, good-natured and quiet, and possessed the happy faculty of disappearing when not wanted. She may have been a shadowy reflection of my mother. When I acted as president she was always near me during state functions, and as railroad magnate she often used to ride with me on a special car, but in war and on all boisterous occasions I forgot her entirely. And it is the beauty of imaginary people that when they are forgotten they do not exist.

My weekly paper tolerated imaginary news for four years. Three years it was scattered at random with the real news, but on the fourth it was carefully segregated in a column by itself, under the title of " M. B. (make-believe) News." Then it disappeared entirely. Exlose, however, was endowed with great vitality, and continued to exist even though newspaperdom was closed to it. The paper dropped it on the transitional stage between war and industrialism, at a time when industrialism was sorely beset by fire. The excitement of war lacking, new factories were burned daily, and railway trains were continually leaving the track or breaking through bridges. The fire at 211 Wabash Avenue is representative:

FIRE!

Feb. 16.—There was a great fire to-day at 211 Wabash Ave. in J. C. Tombs & Co., new shop stared last week in Tub buissness for printers to wash type in. The fire bróke out at 4.15, and was put at 5.40. Cause is not known.

But as quiet settled down upon the land type, ink, paper, toy and furniture factories began to prosper without fire, and trains kept steadily to their tracks. With this peaceful uninteresting stage Exlose ceased to furnish news material. At last I realized that perhaps my aunt could not appreciate the subtleties of my fanciful imagination. There is little record of later industrial developments. A factory arose, flourished awhile in imagination, and left no trace except in memory.

Later geographical and political evolution, however, is well preserved in a series of small atlases—published by The Dayton Times Company at Printston, edited by ex-Senator J. M. Eldbridge, with statistics compiled by Mr. C. F. Fredericks, and maps designed by Mr. William R. Ross. The third and last edition of the Exlose Atlas appeared when I was fourteen. At that time I was passing from the fanciful imaginings of childhood to the more worldly day-dreaming of adolescence.

This strange World was at its hight shortly after the rejection of "M. B. News" from the papers, when I was eleven. At no time did I have so little regard for reality and so great a regard for the make-believe, as then. Half my life was lived in the imaginary city of Printston, and I was a more patriotic citizen of Dayton than I was of the United States. But as I approached adolescence I sought about more and more for realities. I became interested in things mechanical, and such real trivalities as windmills and bicycles set at nought the fine dreams of republics and empires. Such charming and ideal personalities as Mr. James Howe, or Jimmy, or Miss T. O. Jinks, and even my shadow Wife were all dropped for more earthly acquaintances within my social circle.

My last dalliance with the make-believe was shortly after the publication of the third atlas. Flushed with the new interest in baseball and baseball leagues I forgot the real world for a moment, and compiled a list of eight Daytonian cities, adjusting to them a daily imaginary league standing. Despite the worldly taint of this aftermath, old Exlose associations were strong, and the sentimental cities of Printston and Wicwar were given the highest standing and best players.

Exlose was a strange medley of history, geography and current events, all presented with a materialistic undertone. Why so few rewards and no fairies? I read few fairy stories. Why no kind providence and angels? I had little religious training. Why so much war and politics? I read the daily newspaper. Why so much industrialism? Mine was a manufacturing town. Nature gives the boy an imagination, but she leaves Society to supply its furniture.

ALPHABET FRIENDSHIPS

By Lorey C. Day, Baldwinville, Mass.

Alphabet friendships are not unlike human friendships. A certain fortunate man becomes associated in the mind with many pleasant experiences; man and pleasure are confused, one suggests the other, and both make for the fine sentiment of friendship. And letters of the alphabet, becoming associated through words with pleasing ideas and events, gradually evolve a pleasurable quality of their own. Everybody does not have alphabet friendships, but many have them without realizing it. To some people all letters look alike, others admit slight preferences, but more often it is a case of disclaiming any preference whatever, yet at the time showing it strongly in a marked favoritism for specific words.

Human friendship is sublime. In contrast alphabet friendship seems trivial and fanciful, and taken by itself perhaps it is. But they are governed by similar laws. Pleasant associations largely determine both and, after being once firmly established, both exert a powerful influence on later action. A favoritism for particular letters often dictates the choice of names and words, thus vitally affecting literary style; while a favoritism for a certain type face may determine directly or indirectly the kind of books and papers one reads. Alphabet friendships are especially potent in childhood. At that time of course they may be in a formative stage, but they early become fixed enough to influence choices in reading. And the choice of reading is certainly a great factor in the later selection of a life work, to say nothing of its relation to character.

As a small boy I divided most of my indoor time between reading the newspaper and producing hand-made papers of my own. Reading, writing, editing, printing taken all together forced me into a very intimate contact with the alphabet, and friendships developed early. Among the capitals I had nine especial favorites—true friends—an even dozen lesser favorites—mere acquaintances—and five letters which I either disliked or disregarded. Of the numerals two were admitted to friendship, the rest were acquaintances, and zero was held in a kind of neutral regard. The small letters were least favored. None of them were genuine friends. Eight finally became acquaintances, but all the others were socially ignored even though my occupation thrust me into their company daily.

My capital friends were C, E, F, G, J, N, S, V, and Z. The greatest of these was C, with its simple curve, which was both attractive to the eye and easy to draw. But by far the larger part of its prestige was due to pleasant associations; C was the initial of Clifford, my own name, and within my experience were persons of varying intimacy and authority whose names included Clarence, Carl and Charles, while Candlemas and Christmas were two red-letter days of my calendar.

E was the second of my friends, and, like C, it gained much of its prestige by being associated with my social circle, in which there were five Edwards, two Emilies and one Elsie, besides the impersonal "Boston Evening Record," with its large title-line capital E. The names of the months and days of the week were among the first words I learned to spell, and my attention was very early drawn to calendars, almanacs and newspaper date lines where these words appeared in conspicuous capitals. In this way I found further agreeable associations in the E's of September and several other months. The sensuous appeal of the letter was also of importance, for there was a certain visual satisfaction in its sharp straight lines, and I took great delight in making them as sharp and as straight as I could.

F, with a sharp-line appeal similar to that of E, was another letter fortunately associated with myself, appearing twice in Clifford. Among the less important persons were Fales, Fred and a boy-loving neighbor with the initials J. F. February, the only month with an F, was in early years partly given over to a school vacation; and additional vacation associations were furnished by Friday, the last school day of the week.

G gained much by being made like C, and many associations of the one no doubt became confused with those of the other. There was also a peculiar novelty about it, for it appeared in but one month, August, and I saw it little at other times except in the "Boston Globe," which came into the home only one day a week. For flesh-and-blood associates were prominent names within my group—Grace and George.

Next to C my best friend was J. There was a strange satisfaction in drawing and shading its curve and in common print it was a rare letter, thus adding novelty to its intrinsic charms. Among the newspapers was the morning home paper, the "Boston Journal," an occasional "New York Journal" and—among the magazines—the "Ladies' Home Journal," of which I had formed a very favorable opinion because of my sister's girlish enthusiasm for its covers and stories. There was again the good neighbor J. F., and the three months of capital date line appeal—January, June and July. The straight lines of N won it the sensuous prejudice of E and F. Its date line associations were numerous, comprising NUMBER, SUNDAY, MONDAY, WEDNESDAY, NOVEMBER, JANUARY and JUNE, and both New York and Boston newspaper names. Emphasizing these were the more substantial associations which Thanksgiving gave to NOVEMBER, a day off gave to SUNDAY, and vacation gave to JUNE.

The first and strongest attraction of S was its curves which, though hard to make perfectly, were rather fascinating to twist about the pencil point. The letter also had several advantages of early prejudice; my first serious printing was at the time of the Spanish War, and both "Spain" and "U. S. A." were favorable expressions for practice word lists. This choice was much confused with the glamor of war, and some of my six-year-old patriotism was doubtless imparted to the initial S. Further glamor was supplied by the ancient "Worcester Spy," which my uncle frequently mentioned in speaking of the old days. In the date lines S was found in SEPTEMBER and three days of the week, two of which—SATURDAY and SUNDAY—were of the easy-street class. And settling the fate of the letter beyond all peradventure was its inclusion in Symons, the name of my first great boyhood comrade.

I admired V for its clean-cut point, but its strongest hold was secured through novelty—it was rarely seen except in the VOLUME of the front page date line and in the one month of NOVEMBER. NOVEMBER, as in the case of N, had fortunate Thanksgiving associations. Lesser, but reinforcing factors, were the V in the—VILLE of my town and in the name of Queen Victoria, with its splendid royal associations.

Z won purely on its own merit. Sharp lines, enhanced by novelty, were the only claims to friendship. In my early natural history text excursions the Zebra was a startling discovery, and perhaps some of my awe for that animal became associated with Z itself, but other than this the letter had no external attractions.

My letter acquaintances I regarded as a good but mediocre lot. Some of them boasted a slight native charm in the possession of a graceful curve or rigid lines, but native charm without pleasant associations is not sufficient to establish lasting friendship. I liked A for its similarity to V, and it was happily associated with my name, and with APRIL and AUGUST. A really had good reason to be a friend, but its prominence in the name (ASA) of an uncongenial boy precluded it forever from complete friendship. There were few associations about B and D, and they were not adequate to raise the letters above acquaintances. D, being in my name and in the holiday DECEMBER would have doubtless been more highly regarded had it not been so much like O, one of the five unfriendly letters. O, though in the important months of OCTOBER and NOVEMBER, could never become a favorite, for it was too uninteresting and too hard to draw, since round circles are boyish impossibilities. H was in MARCH and associated with a likeable boy, but its use as an initial in the name of an ill-natured school teacher counted very seriously against it. K was a novel letter and built on sharp lines while it lacked associations; L, on the other hand, was strong in associations and weak in novelty and natural beauty. Four people within my group had initial L's, but L is too plain a letter to be permanently interesting even when clothed in sentiment.

M should have fared better, for it was associated with the patriotism of the battleship "Maine," with the names of five people whom I knew well, and with March. Possibly its unsavory relations with Monday—Blue Monday—excluded it from a more friendly regard. P had neither native grace nor fine associations, and Q was favored only because of its novelty. Many things were pleasantly suggested by R, but most prominent of all were the names of Roy, a neighborly lad, and a Mr. Russell, who had contributed generously to my stamp collection. Like M, R should have been more than an acquaintance, but I had such difficulty in shaping and balancing its various curves that considerable unpleasant sentiment became attached to it. W was closely related to V yet lacked entirely the latter's appeal; while X, though novel and conspicuously associated with the lurid "EXTRA!" of the evening papers, seems to have fallen into partial disgrace through its resemblance to the x of the multiplication table.

Of the neutral or disliked capital letters (besides O), I had no associations, good or bad, and its simple structure made no striking appeal to the sight. T was the victim of bad company, being the initial of two names—of a man and a town respectively—which were in local disfavor. U was uninteresting and without acquired sentiment, while Y, the last of the unfortunates—though happily bound up in good names—was lost to all friendliness because of its troublesome construction. I suffered more correction in learning to draw the capital Y properly than I did with any other letter in the alphabet.

The numbers were all more or less friendly, though 4 and 6 I held in especial regard. The early contact with the almanac and newspaper date lines had established a prejudice in favor of all numbers. This prejudice was still further intensified by a later and continued admiration of the showy gilt numerals of the railroad locomotives. In a general way I favored even numbers over odd, due chiefly to a superstition acquired from some uneducated grown-up. 1, like I, was too plain, and saved from oblivion only through being associated with my birth year, 1891. 2 was suggestive of February 22 (Washington's Birthday) and my own significant birthday, October 22. I tolerated 3 because it was a number, but I usually passed it lightly on account of its unpleasant relationship with 13.

4, the first of my two greater numeral friends, won its prestige wholly through association. "4:05 o'clock!" was a vital part of my first experience with the "Latest Extra!" while March 4, July 4, and December 24 were all momentous dates of my private calendar. 5 gained somewhat in 4:05 and December 25, but lacked other impressive associations. 6 may have won distinction by its curves, though its leading attraction is traceable in 1896, the year I began to read dates, and to 1860 and the other Civil War years, which my study of battle pictures had firmly fixed in mind. 7 was only an acquaintance because of its prosaic shape, and 8, though curved, suffered a lack of associations, while 9, with several important date associations, was hard to draw and became too suggestive of work.

Although I was constantly using the small letters, as a rule I did not like them. Perhaps it was this very use which robbed them of their novelty and dwarfed any embryonic associations. They were commonplace. A capital seldom appeared more than once in a sentence and a full capital word was something of a marvel. A little sentiment became linked with f, g, r, s, and z, but it was at best merely a residuum of the larger sentiment of their favored capitals.

After following them a few years some letters, particularly capitals, seemed to develop facial and other motor expressions. Many of these expressions were so vague as only to suggest a certain emotion or feeling, but several of them were quite distinctive. Though a factor in friendship, a fancied facial expression apparently did not influence it seriously, for some friendly faces bore very unflattering marks while some neutrals or dislikes really had smiling, attractive features. The actual shape generally determined a face, but my interpretation of the shape was in some cases slightly biassed by my previous experience with the letter.

The first face having an easily describable expression was that of D, which was proud and haughty. E was rather ugly, ill-natured and inclined to be ferocious at times. G was stout, jolly and smiling; J was matter-of-fact and took life calmly. L was determined yet sensitive, and M sat back with a self-satisfied smile. N was in a perpetual hurry. S, too, was restless and about to leap forward. T, with its drooping top and evil associations assumed a kind of injured, hang-dog air. There was a peculiar freshness about V, but W and X were both nervous and agitated, seeming to move forward jerkily yet without making progress; Z, however, though quick motioned, went along smoothly and was not nervous in the least.

The common Roman Regular Modern style was my first conception of printed type and prejudice was very much in its favor. In the beginning I had a general preference for all Regular Modern faces, but as my experience widened and my mind developed, I came to discriminate between the different kinds of type. Largely because of the newspaper date line associations, the moderately shaded Modern became a source of special admiration. For some years I could appreciate nothing else, but contact with some old books gave me a favorable impression of Caslon Old Style. Regular Modern friendships then extended to Old Style, so that my individual favorites were similar in either alphabet, although Old Style G, J, and Q secured a particularly strong hold because of their more marked divergence from the Modern design. The irregular numerals generally used with Caslon faces at first annoyed me, despite their novelty, but finally I came to enjoy them as much as their Modern brothers.

These two general faces were the only ones that I esteemed highly—all others were "foreigners." Many I did not consider at all, but for some I had a marked aversion. The heavy black Gothic of headlines and cheap advertisements, and the finer Donaldson were my greatest dislikes. With a prejudicial background of two type styles I had become conservative enough to look askance at new designs. At best the heavy Gothic is of doubtful esthetic value, and many laborious attempts at imitation had contributed some odious associations; while Donaldson had been straightway condemned when I was introduced to it in the pages of a certain very dull magazine.

My earliest expressions of friendship were in the form of aimless word lists. In these Z was often a leading letter, and such words as Zebra were continually repeated; but not infrequently, when my vocabulary proved too cramped to display my favoritism with effect, I would invent jumbled words of my own. At a later time brief Hog Latin paragraphs furnished a means of friendly choice:

> Ozt. 31, 1898 Mzn. Lozrfi C. Dzy Gzzbzy.
> U.Z. Iz Rzin Aznzmj 23, 1898—Zh czfz Szz W U.Z. Doz's foz Oze Cenz—EZD—Tuedaz Aznzmj :23,98.
> SOME OF KINGSURE'S TALK.
> Zqj. Z. Q.Xogoz rozk Xthogn znq Zonva
> The A.S. pepol are nothing but fools.

Less directly my selection of names signified my growing friendships. The choice of "Journal" for the name of my weekly paper, though partly due to respectful imitation, was greatly influenced by its inclusion of J and N. My imaginary boy's world had a strong political and geographical flavor, and I was lavish in bestowing names on all its make-believe people, towns and countries. With initial C's there were Caledonia, Carelton, Clifton, Contosel, Cornel, Cornelia, Cristina, Chinatun, and Czarinae; with initial J's Janez, Japino, and Messrs. Jakson, Jinks and Jimmy; besides innumerable words with S, V and Z. This very process of choosing names and the self-made imaginative associations growing up about the make-believe people and things further strengthened already existing preferences, and perhaps helped to establish new ones.

My numeral favoritism was also first displayed in meaningless lists. Sometimes twenty or more years would be selected at random and arranged in a column or, again, a number high in the thousands would be followed out through several decades. In these higher numbers there seemed to be a sort of fascination in approaching the end of a century and entering upon a new one; a half-page list of the complete series from 21,784 to 22,815 is characteristic. For more than two years my paper printed regularly a mystic combination of figures which changed from issue to issue. The set taken from the "United States Journal" of January 9, 1899, is an especially striking example of number friendship:

445	21,468
190,444	No. 111

"No. 111" was the serial number of that particular issue, but the others have no reasonable explanation other than friendly regard. At all times in these early days the "Journal's" front page was little more than a medley of numbers and dates, and for several years I persisted in reducing all personal news to hours, minutes and days of the month:

> Willie carried his grandmother to ride Oct. 10, 1899.
>
> Grace went to Ashburnham at 7:15 and she got thereat 8:30 Oct. 10, 1899.
>
> Mr. Osborn took the carpet up in ma's room Tuesday, Oct. 10, 1899.
>
> Mrs. L. E. Day and Mrs. Yeager went to Gardner Tuesday afternoon Oct. 10, 1899.

"Make-believe" circulation figures and the losses of killed and wounded in imaginary battles show numeral favoritism in no less degree. In the play railroad world I displayed my prejudices more strongly. The even numbers were favored by being given only to passenger locomotives, while the odd numbers designated freight and switching engines. Numbers 2, 4, and 8 drew the accommodation trains, but Number 6 went out exclusively with the great midnight and mail expresses.

In later years my letter and type partiality was not so marked, but the friendships continued to serve me, though less and less consciously. If I "browsed" about a library my choice of books was seriously influenced by type styles, and a richly shaded Modern or Old Style face would lead me to look into a heavy exposition where fiction in an unfriendly type would be passed over as dull. Alphabet friendships were no mean factor in determining my present more substantial friendships for certain branches of science and literature. Even today cursory reading often follows in the old paths, and whenever I buy a daily paper in a strange city I invariably pick the one with the most familiar Modern date line, or with the most friendly letters in its name.

NOTES ON THE SCALP AND HAIR

By Clara P. Fitzgerald, M. D.

No one type of personal hygiene appeals to so many people perhaps, as the care of the scalp and hair, and certainly no part of the body is more frequently exposed to disease. In America there are few physicians interested in the scientific study of the subject, while in Europe, in the clinics and laboratories, may be found many earnest workers devoting a great part of their time to this important specialty.

At the St. Louis Hospital in Paris, for example, Dr. Sabourand, of international reputation, holds free clinics every week, reserved exclusively for diseases of the head, and one need only see the immense number of patients there to realize what a real necessity is this department of medicine. The simplest cases are given earnest attention and in doubtful or obscure ones, the well-equipped laboratory in connection with the clinic is a distinct advantage to the patients and post-graduate students alike, because no diagnosis is confirmed until every method known to medical science has been tried.

Besides Sabourand, Doctors Brocq, Darier and Gastou of France and Unna of Germany are some of the noted specialists who have contributed valuable data on the histology, pathology and therapeutics of the hair and scalp.

Dr. Sabourand's unique treatment for ringworm of the scalp has helped to make him justly famous. Where formerly it required months to eradicate this troublesome, contagious disease, the cure is now effected in about as many weeks. The school for " ringworm pupils " at the St. Louis Hospital, Paris, is both interesting and instructive, for here the affected children are obliged to stay until the microscope proves all traces of the infection have disappeared. Teachers are employed by the city so the regular school work is not interrupted and at present the number of pupils averages about one hundred, while formerly two or three times that many were seen.

The important rôle ringworm and other contagious diseases of the scalp play in the school life of many children has been admirably set forth by Edward Millar Steven of Edinburgh in his book on " Medical Supervision in Schools," being an account of the systems at work in Great Britain, Canada, the

United States, Germany and Switzerland, published in London in 1910.

Steven says that in London and other large centers, facilities for bathing and general hygiene are not all that might be desired and the result is that contagious skin affections and pediculosis are only too common. Ringworm is a disease which is conducive to a very large percentage of the exclusions from school. It is estimated that in any given time about 5,000 cases are responsible for a similar number of non-attendances. However, Dr. William Bradford, in his report for 1911, says: "There has been a very marked decrease in the number of cases of ringworm. The decrease is undoubtedly due to the strict exclusion of the children from school until cured and the provision of treatment by means of X-ray."

In Dr. Cruikshank's school clinics at home and school, etc., published in London under the auspices of the National League for Physical Education and Improvement, 1913, will be found very interesting reports on the treatment of cutaneous and other diseases of school children.

If the fungus and its spores are recognized in cases examined under the miscroscope then the case must be excluded from the London schools as infectious. It frequently happens that cases are returned in school certified by medical practitioners as free from disease, generally because no microscopic examination has been made. In 151 cases medical certificates had been given that the children were free from disease and fit to attend school, but in 144 of these ringworm was found; there were three cases of favus and in only four was the destructive organism not found.

Children suffering from ringworm are not excluded from school in New York, but Dr. Sobel, one of the supervisors, who has been working for the department for twelve years and has seen thousands of cases, does not agree with the action of the health authorities in this matter.

In Germany a weekly bath is compulsory for every child attending school, and according to Dr. Cuntz the children show not only a distinct increased capacity for learning but they have very little vermin in the schools—about 1.8 per cent. Contagious diseases of any kind are uncommon judging from the percentage of non-attendance, which is extremely low. The thorough system of medical inspection is by no means better than it is in England, if as good, but skin diseases and vermin are not nearly so prevalent in Germany and it is quite probable that the comparatively few non-attendances can be credited to the excellent provisions made for weekly baths.

Medical inspection of school children is as yet an undeveloped science, says Steven, but should the progress which has taken place during the last ten years be maintained the next decade or two, we shall probably see the banishment of pediculosis from our schools and cutaneous diseases almost eliminated.

As the condition of the scalp and hair in adult life depends largely upon the care of the scalp and hair during childhood and early adolescence the work of medical inspectors in endeavoring to wipe out contagious and infectious diseases of the scalp embodies a two-fold blessing. Dr. David Walsh of Edinburgh has a very good article on the scientific aspects of the prevention of baldness and of certain diseased conditions of the scalp in the Medical Brief, July, 1902, and it deals very intelligently with the importance of early care of the skin and scalp.

Parents owe it to their children to give the same hygienic attention to the scalp and hair as is now so widely and almost universally directed to the teeth. Some favored mortals are inclined to ridicule the alarm less fortunate people naturally feel when the hair begins to grow thinner or the head bald, but the hair is an adornment we can ill afford to lose.

The skin of the scalp resembles the skin of the rest of the body, being a continuation of it, and is composed of hair follicles which contain the shafts of the hair, sweat glands, erector pile muscles (which make the hair stand on end) and sebaceous glands, the last two being appendages of the hair follicle. The hair is in some respects similar to the nails but so formed as to be soft and pliable. The structure of the hair is very complicated and a clear description cannot be given in this limited article. Suffice it to say that the hair has a regular blood supply, very delicate and rather indirect, derived from arterial branches which surround the hair follicle, in the form of a capillary network; and from small arterial loops, which penetrate the papilla from below. Besides the blood vessels are numerous sebaceous glands, which furnish an oily secretion to the hair making it soft and pliable and giving it lustre. This secretion is a constant one in health and is the result of fatty degeneration of the lining cells of the glands, which slowly fill up with the oily matter, burst and discharge their contents. The sebaceous glands empty into the hair follicles in their upper third and are admirably located for lubricating the hair, just before its exit on the scalp. This secretion forms a more or less waterproof coating, the oil being upon the outside of the hair as well as within it. Sebum acts as a hollow cork, through which the hair passes and prevents the entrance of foreign material into the hair follicle. It is in this substance germs find their way and, because of the constant secretion and excretion of the oily substance, together with the activity of the sweat glands, which encourage rancidity in unhealthy hair; added to the natural warmth of the covered scalp, it is very difficult to dislodge and destroy the invaders.

The skin of the scalp sympathizes with the general system and is impaired by illness, worry, excesses of any kind, exposure to cold and wet, improper diet, constipation, nervous, or general skin diseases, or the hair may be abused by rough handling, over-treatment, lack of cleanliness, careless shampooing, strong soaps, injurious dyes, etc. While no specific can be said to restore the hair, valuable information for the prevention and treatment of scalp diseases has been acquired and many of the various germs which destroy the hair or injure the scalp are now recognized.

Attention to the hair and scalp is of special importance to those who belong to families in which premature baldness is hereditary, but it cannot be given too early. Parents should appreciate the importance of giving intelligent care to their children's scalps from infancy. Upon the first shampoo may depend the future of the scalp and hair and improper management at this time may entail endless worry and trouble to the mother and a great deal of suffering to the child.

Many cases of eczema and severe inflammations are directly attributable to faulty technique of the first shampoo of the newly-born child. On the head of the infant at birth will be found a fatty substance, more or less abundant, called vernix cascosa which is not always easy to remove. Immediately after washing the face and eyes the nurse should apply slightly warmed almond oil, or vaseline, to the baby's scalp and after the rest of the body has been bathed, the head should be gently washed with warm soap suds, or preferably a saturated solution of boric acid powder. If the vernix caseosa proves resistant, force should be avoided, the scalp oiled again and an attempt made the following day to wash off the offending material. For some weeks the infant's scalp should be lightly oiled, as this will prevent any accumulation of seborrheic material commonly called " cradle cap " and besides the oil serves to protect the delicate new skin.

The hair may be washed daily the first few weeks, to prevent rancidity of the oil which has been applied, but later it need not be oiled so frequently, nor washed more than twice a week perhaps. The head must invariably be thoroughly dried after each shampoo.

The development of the hair at birth and during childhood varies considerably in different subjects. Some children are born almost bald while others may have hair several inches long. Generally from six weeks to two months after birth, the long hairs fall out, to be replaced by a soft, downy growth. Some children have very poor scanty hair during their whole infancy, but this is not a bad omen, if not excessive or there is no disease to explain it. When the hair is mediocre at eight or ten, it often develops at puberty and remains good in the adult.

The hair of a girl, if kept short during childhood, should not be cut after puberty, for at this period, when the functions of the body are stimulated to greater activity, the hair takes on a stronger growth and this is the ideal time to treat the hair. Young boys and girls sometimes have lustreless hair and a dry, scaly scalp and ringworm is not suspected until the whole scalp is invaded by the contagious parasite. Ringworm occurs so rarely on the scalp of adults that it is looked upon as an anomaly.

The diet influences the nutrition of the hair, and oatmeal and rye bread are recommended for their good effect, while sugar, sweets and salt eaten to excess, leave the hair brittle, owing probably to absorption of the lime salts in the blood.

If the hair is unusually heavy in childhood it may be invaded by an infection, pityriasis, commonly called dandruff, which gradually causes progressive or paroxysmal loss of hair, so that at the age of eighteen or twenty, the hair is noticeably thinner, and this condition persists through life. A simple, safe application for daily, or less frequent use, is five to twenty drops of castor oil to one ounce of sixty per cent alcohol.

Pityriasis, seborrhea and the so-called seborrheic eczemas constitute a morbid group, which includes half the dermatoses of the scalp, occurring between the ages of fifteen to twenty years in both sexes.

Simple pityriasis is the first stage in the history of baldness and some authorities believe it responsible also for the fading of the hair which brings on gray hairs. Metschnikoff states that grayness is due to microbes which devour the pigment. Pityriasis consists of dry scales sometimes hardly perceptible, with slight itching, more marked during sweating, but with no alopecia, or loss of hair. " So long as the squames of pityriasis fall the hairs do not fall." This condition is very tenacious and requires great patience and constant treatment to overcome it. In the course of time it is transformed locally into alopecic pityriasis with apparently fatty scales. In the adult, ordinarily towards the sixteenth year, the scales of pityriasis become thick and yellow and less easily detached. The squames fall no more, but then it is the hairs which "fall." The hairs fall off more and more, at first in the summer, but afterwards at all seasons, sometimes in bunches, sometimes gradually. The hairs which fall come out entire, but have a tendency to be replaced by new ones, which, in untreated cases, also fall out. Oily pityriasis should be treated actively for several weeks and then lotions applied for the purpose of keeping the scalp free from fatty material.

In women pityriasis may be worse between twenty and twenty-five, while the hairs fall more rapidly between twenty-five and thirty-five. In men it usually starts at an earlier age. Pityriasis is an insidious enemy to the hair and so slowly but surely does it work that it has caused almost irreparable destruction before the nature of the invasion is revealed.

Seborrhea causing baldness appears clinically, according to Sabourand, as the third stage of the disease, and, as a rule, the younger the subject, the quicker the progress. When it commences at eighteen, for example, it causes baldness at twenty-five, with a fall of perhaps three or four hundred hairs daily. When the seborrhea commences at twenty-five it only ends in complete baldness at about fifty-five or sixty, with a loss of from thirty to sixty hairs daily, varying according to the season. The hairs fall out entire with their bulbs, but are reproduced by other hairs, which fall in their turn, each growth being slower and more scanty, until only a downy growth remains on the scalp.

The treatment of baldness gives only mediocre results, but not none at all, as many believe. The cure of baldness does not exist in the sense of restoring the hair completely, but carefully directed treatment of a seborrheic scalp may retard for many years, a baldness in process of extension. The treatment varies according to the stage of the disease and the toleration of the skin for useful medicaments. The scaly element must first be treated by sulphur or oil of cade ointments applied at night and washed off in the morning. Later repeated soapings every night to remove the sebaceous exudations, the stagnation of which appears to be toxic for the hair, and followed by frictions in the morning with a lotion selected with respect to its adaptability to the particular condition.

For women with long hair where the oiliness is intense, dried oatmeal or rice powder and precipitated sulphur equal parts rubbed into the scalp daily, with frequent washings, may prove helpful.

By careful prescribed measures, varied by the results obtained, the intensity of the disease may be diminished, but probably in most cases without arresting it completely. However a delay of five to fifteen years in the evolution of baldness may be considered a satisfactory result, in the case of a disease which is so unquestionably refractory.

When there is the slightest doubt about the nature of a scalp disease, a physician should be consulted and if necessary a microscopic examination made. Not only are many scalp diseases damaging to the hair but some are contagious, like seborrhea, ringworm, favus, alopecia, syphilis, sycosis, pediculosis impetigo and other less common ones, and it is very difficult to differentiate sometimes. Any of these diseases could be contracted through the promiscuous use of infected toilet articles or by frequenting unsanitary barber shops.

Blonde, brunette and white hair require different treatments. Agents like resorcin, beta napthol, oil of cade and some other remedies discolor light hair. If the skin of the body is sensitive the scalp is likely to be more irritable. Fine thin hair demands more gentle handling than coarse thick hair. Hair dyes not infrequently cause eczema even in remote parts of the body, and even severe cases of poisoning have been reported.

Excessive friction of the scalp, defective hair pins and combs, unclean brushes, all are injurious, and the best that may be said of most popular hair tonics is that they are useless. The frequency of shampoos must be regulated by experience, the nature of one's employment, the facilities for doing the work properly, the condition of the scalp, the kind of hair, but there is no exception to the rule that the scalp and hair must be kept clean. It may be said that every second or fourth week is sufficient for those not exposed to more than the usual amount of dust, while for those so exposed, every week or even oftener may be necessary.

The practice of daily sousing the head with cold water is pernicious, not because the water itself is harmful but because the scalp is rarely thoroughly dried afterwards. Women are particularly cautioned never to bind or pin up their hair or to comb or brush it while there is the slightest suspicion of dampness whether directly after a shampoo or any other time.

While the quantity and quality of hair is largely determined by heredity, the preservation of the hair and the health of the scalp are influenced materially by cleanliness and good health of the whole body.

SUGGESTIONS TOWARD A STUDY OF MEDIOCRITY

Gustave A. Feingold, Harvard University

Principles of Educational Psychology no longer leave any doubt about the advisability of separating school children into two general classes: the normal and the subnormal. More recent investigations are beginning to justify the segregation of the supernormal also from the average type. This process of putting the backward pupils into a class by themselves and the 'brilliant' ones into another distinct class, ultimately results in leaving behind a large residue, probably 75 per cent of all school children, whom we designate as 'mediocre.' More and more does our attention become fixed upon the two positively selected groups—the stupid and the brilliant. For them we devise special methods of instruction, for them we appoint special teachers, for them we keep special records. But it must be obvious that a great injustice is apt to accrue to the middle group unless we give them also the same careful attention that we bestow on the others.

What do we mean by mediocrity as applied to the intellectual abilities? Surely that term cannot mean 'average' in the ordinary sense of the word. For if it means that, then why should the mediocre person, *i.e.,* the person endowed with average intellectual abilities be regarded with scorn, whereas the person of average height or of average strength is regarded as blessed? Evidently the world does not believe that there ought to be many degrees of differences in intellectual endowments. Qualitative differences there may be; the more, the better. But not differences of extent in any given quality. And we, pedagogues, seem to hold the same view. For do we not group our pupils into five classes only (A, B, C, D, E), according to our system of grading? Yet I warrant that if people were to be graded on the basis of physical achievement, such as running, or jumping or lifting weights, they would fall into more than five classes. Now this seems to contradict the psychophysical law which says that the more numerous the physiological factors involved in a given mental function the larger will be the individual differences in the exercise of that function. On the basis of such a law the world ought to be willing to 'put up' with mediocrity, and our social engineers should stop pointing the finger of scorn at those that are down low in the intellectual scale.

In spite of this incongruity, however, public opinion is right. No; there should not be many degrees of difference in a given mental capacity. For it should be noted that the above psychophysical law states only half of the truth; because in proportion as the physiological factors involved in a given mental function are more numerous in that proportion will any defective combination be compensated by a new combination. Hence mediocrity is inexcusable. How, then, shall we account for its existence? It must be that there is something wrong with our educational system, And by 'educational system' I do not mean mere school curriculum. Rather do I mean all the social factors—religious, moral, nutritive as well as educational proper—which are involved in the development of the human individual.

Just now we are confronted by a grave social undertaking, namely, the attempt to measure intellectual capacity by some objective standard, and on the basis of such measurement to determine a person's career, his life-plan and his fate. The immediate outgrowths of this desire are to be seen in the two movements of the day—Eugenics and Vocational Guidance. The one promises to supply the proper individual, the other undertakes to locate him in some particularly circumscribed vocational (and therefore social) niche, and to see that he stays put. Both of these movements are excellent in their ultimate aims, but unless our political and economic institutions make a serious effort to set themselves in harmony with the spirit of the age, these movements will not only be out of place, but they will redound in great injury and injustice to the feeble and down-trodden. Not until it has been demonstrated beyond the shadow of a doubt that society is discharging all its duties toward the individual have we a right to interfere or to tamper with that individual's life, freedom and pursuit of happiness. The greatest ills that society suffers from at the present time are not ills which emanate from the perversity of individuals but rather from the laxity and decadence of social institutions; therefore the proper and most expedient way to remedy those ills is to modify the institutions.

A simple instance showing how totally misinformed we still are about human capacities is brought out by the problem of mediocrity in schools and colleges. And in this little paper I propose to show (1) that the term 'mediocre' does not describe the native intellectual capacities of those to whom we apply it; and (2) that the 'mediocre' or middle group of students is an unstable type, capable of further separation and classification on the basis of achievement, provided the proper guidance, encouragement and stimulus is given.

For some four months I have had occasion to study the progress of 49 college students who were taking an elementary course in Greek Philosophy. It may be safely said that the study of such subjects as philosophy, chemistry or mathematics involves a certain type of learning, the rate of which is measurable within certain limits. To be sure the measurement of progress in such studies as these can not be as accurate as is the acquisition of skill in telegraphy or typewriting, for instance. In the latter case the number of physical and mental coördinations to be acquired are comparatively few and simple; also they are fixed and definite. The key-board has to be memorized, the proper fingers habituated to the proper keys, the right amount of pressure exerted, the copy read and spelled out, and so on. In short, inasmuch as the process is one of habit formation, the rate of learning continues steadily in a straight line. The individual constantly increases his speed and accuracy until he reaches his physiological limit. In this instance the subject matter may be said to be constant while the mental processes constitute the variable that we are trying to determine.

But in learning such a subject as philosophy or mathematics we have two variables: the mind itself and the topic. For surely such a complicated study cannot be said to be fixed and definite like typewriting or ball-tossing. On the contrary, it is continually increasing in complexity; continually unfolding new facts, relations and distinctions which the student must acquire, recognize and discriminate as he goes on with his lessons. How should the rate of progress in such studies be measured? The only way is to see whether the grade attained in their elementary stages is maintained in their advanced states. If it is, then progress is going on. If not—if the grade begins to fall as the complexity of the material increases, then we are justified in saying that the student has reached his intellectual limit for that particular study at the point where the decline occurs. Of course, if the grade happens to be low at the start and gradually rises double progress is shown. This, however, is a rare occurrence.

Now in segregating the dull pupils on the one hand, and the bright ones on the other we proceed on the assumption that they are fixed mental types. But what about the group we leave behind,—the group that is characterized by the grade C, the 'mediocre' group—is that also a fixed type? If not, is it variable? And if variable what further forces can we bring to bear on it in order to separate its members into their proper spheres?

Method of Procedure

My method of studying this problem was to meet the class of 49 college students either weekly or bi-weekly, and to give them a written test on the subject matter (History of Greek Philosophy), that they were supposed to have learned both from the lectures and from the text-book during the previous week or two. In each of these tests three questions were given: one of a general nature, the other referring to fact, and the third calling upon the creative faculty, *i.e.,* it called for practical philosophizing on the part of the students. Ten tests were given, nine of 30 minutes each, and a final one lasting 3 hours and covering the entire course. The distribution of the grades for the nine short tests and the final three-hour one are given in the following table.

TABLE I

Distribution of Grades

	Order of tests	A	B	C	D	E	Total
	1	9	9	14	8	4	44
	2	6	20	6	8	4	44
	3	1	8	20	16	2	47
	4	1	15	21	6	4	47
	5	2	11	12	11	6	42
	6	6	9	18	7	3	43
	7	6	19	16	5	0	46
	8	3	14	12	5	5	39
	9	4	10	21	8	4	47
Final Test	10	*2*	*5*	*26*	*11*	*4*	48
Final Grade		*3*	*10*	*25*	*8*	*2*	48

The result of the first test shows a comparatively equal distribution of grades. If we consider the A men as 'excellent,' the B's as 'good,' the C's as 'mediocre,' the D's as 'poor,' and the E men as 'failures' or 'backward,' we find, according to the first test, that there are almost as many 'poor' men as good ones, as many good as excellent, while the mediocre constitute only 30.2% of the total. In the second test, however, a re-alignment occurs; three of the excellent men drop a grade below, whereas eight of the mediocre climb up a peg. In the third test there is another readjustment, and the distribution takes the form which it retains, with but slight variation, throughout the course.

Now why this change? Is it because the minds of the students could not keep up with the increasing complexity of the material they were trying to master? Or is it because the questions set for the successive tests became disproportionately more difficult? Or finally, is it because I began to mark more strictly as the course progressed? The second and third possibilities I tried to eliminate as far as any teacher possibly can. It should be admitted, however, that I marked somewhat liberally on the first and seventh tests. This, however, does not account for the diminution of the A's and B's on the other five tests and for the increase of the C's and D's. Does this mean that the first possibility is the true cause of the change, namely, that the mediocre class results from inability to keep up with the increasing complexity of the material to be learnt? This question can be answered only by making a study of individual cases.

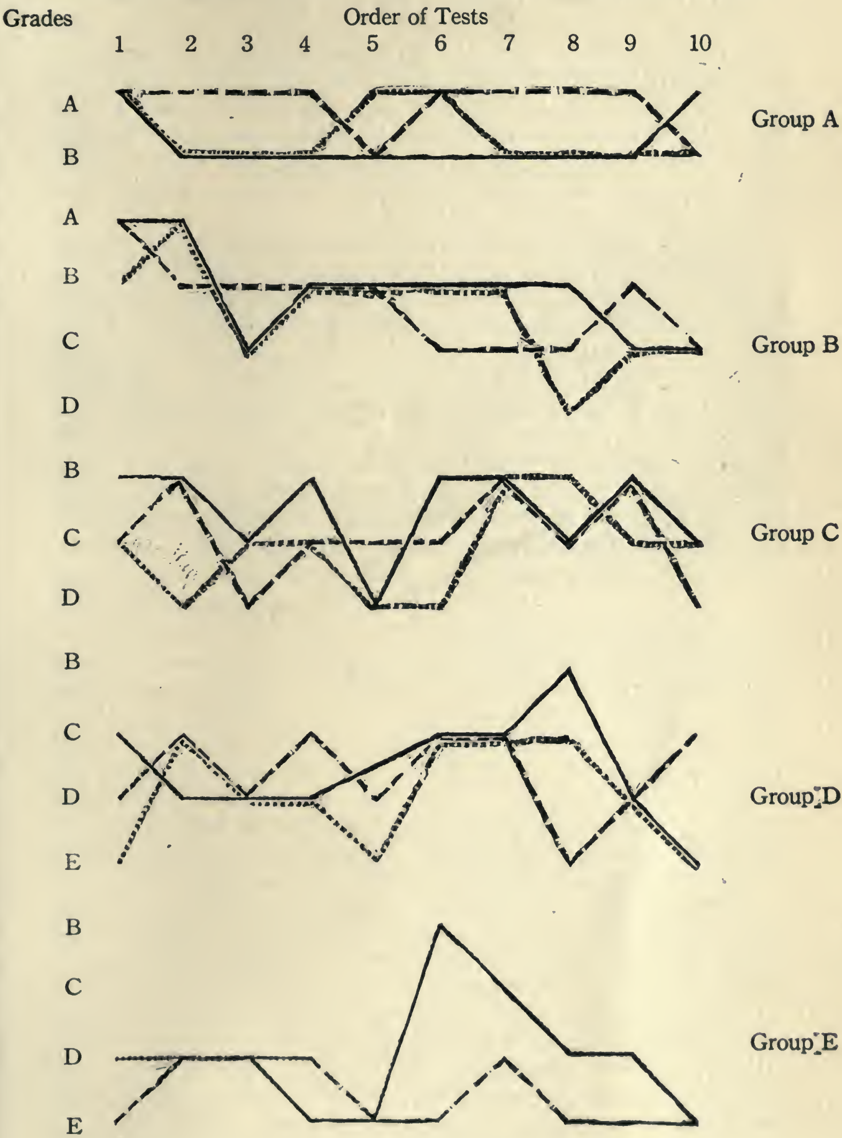
My next step was to investigate the weekly grades of each one of the A men, the B men, the C men, and so on. As there were only three A students and two E students in the final results, I selected three 'typical' men from each of the other ranks for the purpose of comparison. I found that the

3 A men had	13 A's,	16 B's,			
3 B " "	4 A's,	15 B's,	10 C's,	1 D	
3 C " "		11 B's,	13 C's,	6 D's	
3 D " "		1 B,	12 C's,	11 D's,	5 E's
2 E " "		1 B,	1 C,	9 D's,	9 E's.

Glancing at this distribution we notice a certain fixity among the A, B, and E students, whereas the C and D men vary considerably. This is best brought out in the following graphs wherein each individual's grade is shown separately.

Degrees of Variation of the Three Individuals in Their Respective Groups

Looking at the curves of the C group—the mediocre men, we notice that not only do the grades oscillate almost uniformly between B and D, but on no occasion, with the exception of one, do all three men receive the same grade on the same week. Now if the mediocre type were fixed then all or nearly all members thereof ought to react uniformly to a given situation, *i.e.,* they ought to vary in any direction together. Such a tendency is observed among the B and E men. The former receive the same grade on three distinct occasions, the latter on four distinct occasions. The D men also receive the same grade simultaneously on four separate occasions. Not so, however, with the C group. Then, too, Degrees of variation of the three individuals in their respective groups



the total variation is more conspicuous—covers a larger area—within the C and D groups than in any of the others.

Why is it that the 'mediocre' individuals sometimes did well and sometimes badly? Thinking that several of them had received special prompting or tutoring in preparation for some of the tests, and that it was on such occasions that they had received the good marks, inquiry was made among all the men whose grades are plotted here, and it was found that only one individual, belonging to the E group, was tutored on one occasion—for test 3.

It would seem, then, that the individual differences found to obtain among the so-called mediocre men justify the following conclusion, if conclusions may be drawn from such fragmentary data, (1) the middle group students are not mediocre in their mental grasp, but more erratic in their methods of study; (2) since the C group is constantly fluctuating, a closer analysis of it would yield material for the next higher group; (3) it is preëminently necessary that individual attention should be given to the 'mediocre' students as well as to the 'backward' and 'brilliant' ones, because they are in an unstable state of mental equilibrium, and everything with them depends upon the proper stimulus.

THE DOCTRINE OF FORMAL DISCIPLINE

By C. K. Lyans, Clark University

An attempt to discuss the doctrine of formal discipline finds itself balked at the very outset by the question: "What is formal discipline?" The literature on the subject shows a great variety of definitions, but one division between writers comes out with special clearness: those who attack the doctrine have a very different definition of it than have those who defend it. The result is that the opposing sides in the controversy have failed to clash: dispute has tended to magnify their apparent differences, and has minimised their real points of agreement—and there has been great confusion.

To clear the field, I shall take first the definition of the doctrine as seen by its foes, and as seen by its friends, and seek from a comparison of the two views to determine what the controversy has really been about.

(1) As seen by its foes: Two things have especially occupied the attention of those who attack formal discipline—they have seen in it a doctrine that training is transferable, and have found its basis in the faculty psychology. Also, they have seen it as a doctrine having much to do with the selection of studies, and little to do with the pedagogy of instruction: it is to them the weapon of the formalist, used to defend subjects that have lost practical utility. Henderson defines it as meaning "the supposed effect of study upon the mind, entirely apart from the content of what is learned." Monroe reiterates the definition, but amplifies it much further. According to him, the doctrine teaches that "a particular activity or experience, especially of an intellectual character, if well selected, produces a power or ability out of all proportion to the expenditure of energy therein: a power that will be serviceable in most dissimilar experiences or activities, that will be available in every situation, that will be applicable to the solution of problems presented by any subject, however remote from the one furnishing the occasion for the original disciplinary experience." (16, p. 508.) His discussion, again, is followed by Graves (10, vol. 2, p. 309). Since all agree, however, in citing Locke as the

first writer who clearly formulated the disciplinary conception for education, especially in his "Conduct of the Understanding," we have in that work a basis for criticism of such definitions as that just quoted from Monroe. Therefore, before touching on the views of contemporary defenders of formal discipline, I shall give a brief analysis of Locke's doctrines:

(2) As seen by its friends, Locke's "Conduct of the Understanding" contains, though in a rather unsystematic way, some treatment of nearly every factor of the learning process recognized by the most recent psychologists—even to the influence of the attitude or 'set.' We may note the doctrines most significant for our purpose under five heads:

(a) Reasoning. Good reasoning, says Locke, demands a large, sound, roundabout sense, "conversation with many sorts of men, contact with many sorts of books and notions. If one would reason soundly, he should "take a taste of every sort of knowledge: it is certainly very useful and necessary to form the mind."

(b) Improvability of functions. Under this heading comes a statement of what Thorndike calls the laws of use and disuse: Of disuse, "The great number is of those whom the ill habit of never exerting their thoughts has disabled." (1, p. 207.) Of use, "We are born with faculties and powers capable of almost anything, such at least as would carry us farther than can easily be imagined, but it is only the exercise of those powers which gives us ability and skill in anything." (1, p. 190.) He emphasizes, however, the specific character of training—which is the more significant because there was no controversy over the question of specific vs. general training, in his day, and therefore any but a very careful thinker or writer would have been pretty sure to use generalizations which would seem to ignore the specific nature of training, no matter how thoroughly he himself believed that improvement of functions does not transfer. Never having encountered any other view, he might quite naturally take for granted that no other view was held, and feel no need of going into particulars. But Locke did go into particulars. He points out that we learn to dance only by practice in dancing; to think by thinking; and, indeed, that even such a seemingly innate quality as ready wit in conversation is very much the result of practice, "to be raised to that pitch only by repeated actions." (1, p. 191.)

(c) Transfer. Yet Locke does teach that training may transfer, although he has emphasized its original, specific character. This comes out strongest in the case of mathematics, where he even uses the term "transfer." He says children should be taught mathematics so that "having got the way of reasoning, which that study necessarily brings the mind to, they might be able to transfer it to other parts of knowledge as they have occasion." But he sees clearly that this transfer may work for evil as well as good: "A metaphysician will bring plowing and gardening immediately to abstract notions, the history of nature shall signify nothing to him." And again, "Some men have so used their heads to mathematical figures, that giving a preference to the methods of that science, they introduce lines and diagrams into their study of divinity or politic inquiries, as if nothing would be known without them." (1, p. 221.) It is precisely because too wide a transfer of one type of mental habit ensues from a one-sided education, that Locke insists on a many-sided education. He insists—to repeat a quotation already given above—that one should "take a taste of every sort of knowledge; it is certainly very useful and necessary to form the mind." He warns against the uselessness and danger of having only a smattering of everything, and points out the necessity of mastering one's own particular subject, but for one who heeds these warnings, "the end and use of a little insight in those facts of knowledge which are not a man's proper business, is to accustom our minds to all sorts of ideas, and the proper ways of examining their habitudes and relations. This gives the mind a freedom, and the exercising the understanding in the several ways of inquiry and reasoning which the most skilful have made use of, teaches the mind sagacity and wariness, and a suppleness to apply itself more closely and dexterously to the bents and turns of the matter in all its researches. Besides, this universal taste of all the sciences, with an indifferency before the mind is possessed with any one in particular, and grown in love and admiration of what is made its darling, will prevent another evil very commonly to be observed in those who have from the beginning been seasoned only by one part of knowledge. Let a man be given up to the contemplation of one sort of knowledge, and that will become everything. The mind will take such a tincture from a familiarity with that object, that everything else, how remote soever, will be brought under the same view." (1, p. 215.)

(d) Attitude. The quotations already given are sufficient to illustrate Locke's position concerning the attitude or "set" and many more quotations could be given, for his doctrine on this point pervades and colors his whole treatise. He recognizes that one pursuing a given subject develops an attitude appropriate to that subject; that one whose education, being confined to one subject, has provided him with but one attitude, will apply that attitude to all subjects, from not having learned a better mode of attack; and therefore it is highly desirable to provide in education, through the study of a variety of subjects, as rich a repertory as possible of "sets," so that in dealing with new material—or for that matter, even for the sake of dealing more effectively with the old—the mind may "apply itself more closely and dexterously to the bents and turns of the matter in all its researches."

(e) He insists on the importance for thinking of close attention, pointing out that habits of hasty and desultory work result from its neglect.

This plainly does not square with Monroe's description of the disciplinary conception in education. According to Monroe, that conception teaches that (1) education in one well-selected subject, rather than in many, is best; (2) there is unlimited transfer of training; (3) education in the right subject defies the law of conservation of energy, getting thoroughly disproportionate results: whereas we have seen that Locke, whom Monroe takes as the best representative of this conception; (1) teaches that education should be many-sided; (2) holds a doctrine of transfer differing little from the "identical elements" theory so generally held to-day: and if we take in his doctrine concerning the attitude, Locke's position is wholly reconcilable with that taken by Thorndike, perhaps the leading opponent of the disciplinary idea, in his most recent work. (3) Anything claiming disproportionate results for some particular subject is nowhere to be found in Locke's work.

Turning to Locke's other educational work, "Some Thoughts Concerning Education," we find in his remarks on subjects of study, a corroboration of this interpretation of his doctrine; for his approval or disapproval of various subjects rests almost entirely on practical grounds. Especially noticeable is his discussion of the two subjects around which controversy since his time has raged most violently—Latin grammar and mathematics. He disapproves the manner in which Latin grammar was used in his day, on the ground that the language could be better taught without teaching grammar at the beginning; and the Latin language itself is included in his course of study simply because "it is absolutely necessary for a gentleman"—holding then a place that French has since largely usurped, in England. Speaking of mathematics, he limits the amount of geometry that should be taught, to six books of Euclid, giving as his reason: " I am in some doubt, whether more to a man of business (*i. e.*, man of affairs) be necessary or useful; at least if he have a genius or inclination to it, being entered so far by his tutor, he will be able to go on of himself." (1, p. 149). There are a few remarks, in the discussion of subjects to be taught, that have a slight disciplinary coloring, but the impression one gains from reading that part of Locke's work, is that he is rather too indifferent not only to disciplinary but even to cultural values, in laying out his course of study.

The fact is, Locke's real contribution is in his emphasis on the improvability of functions—precisely the thing for which Thorndike contends in his " Psychology of Learning "—and his theory is not at all at variance with the doctrine that transfer is a matter of " identical elements." On points of detail there are differences, but they are traceable wholly to differences in analysis, not to contradictions in theory. They only raise the questions: what elements are identical? how are we to decide upon the identity of elements?—questions for which we have nowhere a decisive answer yet. It is further to be noted, Locke never taught that " the process of learning, and not the thing learned, is of importance." That introduces a false opposition—his emphasis was on the point that the thing learned—including the process of learning—is important primarily because of its effect on the mind and character; and mere unassimilated memorial learning is worthless. Monroe recognizes this when he says: " One of the most striking of Locke's positions, as well as one of the soundest of them, is the clear distinction he ever holds in mind between education and instruction." (1, p. 515.) This distinction has become a commonplace of educational thought to-day, thanks to the work of Locke, Rousseau, Herbart, and a host of lesser lights, but it was far from a commonplace in the 17th century—and even with us, it has penetrated but a very little way into the schools.

When we turn to contemporary writers, we naturally find more stress laid on the so-called formal side of education, since this is the point against which the opposition has directed its attack. Wendell stresses the importance in education of developing concentration or will-power, saying that hard work of any sort can develop " increasingly and lastingly muscular power of voluntary attention." (12, p. 31.) Münsterberg argues that in the effort to learn any activity, " the development is specific—the formal training of the will is general." But even the " specific character of the training must not be exaggerated. . . . By training for baseball, we secure general alertness in our motor responses." He further insists that (1) since every mental function can really be developed, "one side of mental life must not be crippled in the interest of others, as long as general education is in question" and (2) it is of the first importance that the voluntary attention be developed. Our education tends to neglect this, and so makes for superficiality. (12, p. 34-5.) All the other writers who take disciplinary standpoint also emphasize this, that will-power and voluntary attention can and should be developed by education. Judd goes more into detail concerning disciplinary possibilities in the following passage: "We have been in the habit of saying that this or that kind of knowledge is valuable, and we have not really meant this or that kind of knowledge, but this or that subject-matter. I believe it is time for us to take an entirely different view of what is meant by the term *kinds of knowledge*. The ability to reason independently, the ability to retain the essentials and neglect the non-essentials, the ability to carry on certain types of inquiry in any subject-matter, all these forms of ability are more important than the ability to reproduce a body of particular information. The meaning of this last contention may be made somewhat clearer by saying that what we need in our examination of the high-school course of study is a complete restatement of the values of these courses in terms of the mental habits which are cultivated as distinguished from the information which is gained. We are just at the beginning of a period of study of the effects of education." (12, pp. 39-40.)

In these writers, again, we see that the stress is on improvability of functions, as distinguished from, but not necessarily apart from, the subject-matter through which the improvement is effected. As a matter of fact,—though none of the writers quoted has paid much attention to this point—the subject-matter is part of the process of learning, to be taken into account when we estimate the improvement of a function: we apply our knowledge, not mere formal mental powers, to new problems—but that knowledge, to be applicable, must have been assimilated, organized, worked over into something that looks very much like a formal mental ability. "Mathematical ability," for example, is a knowledge of mathematical facts and principles which has become so much a part of oneself that he uses it as naturally as he would use sight and touch. Even "power of observation" involves the possession of facts available for comparison, and of principles—which are also facts—to guide the comparison; as well as an understanding, to be gained only by experience, of the resources and limitations of the human organism, and of the best methods for attacking the problem to be faced. From one point of view, all this is simply knowledge: from another point of view it is pure mental power.

The second point especially stressed by those who defend the disciplinary ideal, is that the power of voluntary attention, acquired in the strenuous pursuit of any subject, is generally applicable to all affairs of life. But this is only holding that the voluntary attention which keeps a man at work on mathematics is identical with the voluntary attention that keeps him at work on a case at law, or a problem of business administration. Thus, whether or not the holders of the views just quoted accept the doctrine that all transfer is explained by the presence of identical elements in the activity from which and the activity to which the transfer occurs—and most of them, I believe, do accept it—at any rate, their contentions can perfectly well be stated in terms of that doctrine. Indeed, if we read any claim that a certain subject supplies a transferable training, we find it devoted almost entirely to pointing out elements that are in the opinion of its advocate common to that subject and certain other subjects, or certain of life's activities. The defender of Latin grammar and translation work points out the demand which his subject makes upon powers of observation, the mathematician stresses the training of reason; both have much to say about the development of voluntary attention. But by the mode of their argument, they furnish common ground for discussion with their opponents. Prove that the observation which the one talks about, the reasoning power that concerns the other, and the voluntary attention which seems so important to both, are not identical with the activities that bear the same name in other parts of life, and their contention falls to the ground. On the other hand, grant that there is a real identity under the identity of name, and their opponents must grant that training in those activities may transfer, at least. I say "may transfer," because while by this theory all transfer is of identical elements, yet this need not concede that training in identical elements always transfers. Experience gives good reason to believe that it does not. The problem for us to investigate, then, is: "What are identical elements, and what principles control the transfer of training in them?"

I. Experimental Studies

Owing chiefly, no doubt, to the fact that satisfactory methods for comprehensive investigation of higher mental processes have not yet been devised, the experimental data on transfer are almost wholly confined to tests of what we may call peripheral functions, involving very little of the higher powers of observation and reasoning. Therefore experimental results prove nothing, unless by analogy, about the existence or possibility of transfer in precisely those parts of our mental life where it would be most important. In general, there have been two kinds of studies: (1) studies of transferred improvement of memory; (2) studies in the transfer of sensory or sensory-motor skill. Each of these kinds calls for some general observations, after which I shall discuss in detail a few typical experiments.

I. In the field of memory, any physiological explanation of that function would justify us in expecting to find absolutely no transfer of training. When memory was looked on as a sort of psychic reservoir, into which we dumped facts until we wanted them again, it was quite conceivable that use or training could enlarge the capacity of that reservoir; but when we conceive of memory as merely the tendency of a neurone to retain an impression that has been stamped upon it, the only possible effect of repetition would be to stamp that particular impression deeper, and it is not easy to see how the process would make the neurones constitutionally more receptive or more tenacious of other impressions, no matter how similar in content to the one through which the training was received. This objection holds, no matter which of the current views of memory we take. The only conceivable physiological correlate of a direct improvement of memory, is a change in the actual constitution of a neurone or group of neurones, quite apart from the increased sensitiveness of the neurone or neurones to the stimuli representing the subject-matter which furnished the original training. Any direct improvement of memory as a function, is a case of real transfer, even though it be from the learning of one list of nonsense-syllables to the learning of another. Not only is memory not a faculty; it is not even a group of faculties: there are as many memories as there are things learned; every new thing learned is a new memory. Memory is simply a property of nerve substance, and to change this property would change the substance—unless we want to postulate a psychic element of memory which may change without a corresponding physiological change. But perhaps memory does improve, and the constitution of the neurones does change as an effect of training: I am not concerned either to affirm or to deny such a change, but only to point out that if there is actual improvement of memory through training, it can only be explained as accomplished in that way, and if that occurs we have a case of not transfer, but "spread" of training, irreducible to the functioning of identical elements. For practical pedagogy, I believe this is a matter of small importance; we have every reason to think that the amount possible of direct improvement of memory, if any at all, is very slight. Far the greater part of all gain in memorial efficiency is more satisfactorily explained as resulting from improvements in the technique of memorizing: finding advantageous devices of grouping and rhythm, improved methods of applying the attention, ways of invoking the aid of association, and in a general way, getting a better understanding—mostly subconscious, to be sure—of the properties of the nervous substance with which memorizing is so predominantly concerned.

The physiological conception of memory has crowded out the conception of memory as a unit faculty, or as a group of faculties, and so makes it impossible that we should speak of any general training of memory, or of any considerable amount of specific training. But at the same time, it gives us a new and sounder basis for a doctrine of general training in memorial technique. If memory is not a faculty functioning as a unit, yet it has a homogeneous physical basis, for we have no reason to suppose that the nervous substance of different parts of the brain obeys different laws. Consequently, so far as improving the technique of memorizing consists in discovering better ways of applying the principles which describe the behavior of nervous substances, just so far is the technique an identical element in all memorial work, and just so far can it function as such. None, I believe, of these general principles is separated out in memorial work from more special adaptations determined by the subject-matter in which the work is done, but a glance at some of the facts concerning the behavior of memory will serve to show the presence of these underlying laws: (a) The influence of the task and the attitude (*Aufgabe* and *Einstellung*). In actual practice, the task and the attitude are different things when one is learning nonsense-syllables from what they are when he is learning poetry; but in both cases, the task of learning so as to reproduce gets a different result from the task of learning so as to recognize the right order of the words. The "set" to remember for five minutes gets a different result from that brought by the "set" to remember for a week. (b) Finding optimal groupings and rhythms, and optimal length of working periods, of intervals between sittings, etc. These vary immensely, from the comparatively short periods required by nonsense-syllables, to the long periods that are favorable with a subject-matter of a kind that is interesting, familiar, and significant to the learner; but at the bottom in all cases lies the fact that it takes a little time to raise the function to its highest efficiency, and then a certain amount of work is sufficient to bring on the fatigue that reduces efficiency to a fraction of what it is when the function is fresh. There is good reason to suppose that this length of endurance is a constant for any individual, given uniform conditions of health and general bodily efficiency; and that we can work longer at significant material not because the neurones can stand more work of that sort, but because the significance of the material gives any one neurone or group of neurones less to do, spreads the same amount of actual memorial work over a longer period, and allows breathing-spells between. (c) The use of association as an aid to memory. This of course dwindles to a minimum in the case of nonsense-syllables and of any unfamiliar material. To invoke the aid of association, there must be some knowledge in the mind with which associations may be formed: thus the later stages of learning a foreign language become much more efficient than the beginnings, because the basis for associations has been built up. But our interest at present is only in the physiological principle on which the helpfulness of associations for memory work rests. To establish an association with a given impression is equivalent to lowering its threshold. Without the presence of the association, the only stimulus available to reproduce the thing learned is a direct act of will: only an impression of a certain strength can respond to that stimulus—in other words, the threshold of response to a simple act of will is comparatively high. But given the aid of an established association, we have a more adequate stimulus, capable of rousing to response a weaker impression—the threshold of response has been lowered. And the greater the number of associations, the lower the threshold for the given impression becomes, and the less deeply does it need to be stamped in.

This is sufficient to illustrate my point: it is my purpose here only to point out that when we conceive of memory as a function or property of nerve-substance, we destroy the old idea of a general training of memory, but we must also infer in the place of the old idea, a new conclusion, that there are certain laws of learning, based on the behavior of nerve-substance, which are as general as the nerve-substance itself, and therefore function as identical elements in all memory-work, and furnish a medium for transfer of training. It might be added, anticipating what I shall develop more fully later, that the actual amount of transfer becomes much greater if the functioning of these laws is brought to consciousness, either by good teaching or by the intelligence of the learner himself; but I believe there is always and inevitably some transfer, until the limit of improvability is reached, though the transfer may be obscured or even negatived by mal-adjustment to the new subject-matter in which evidence of transfer may be sought.

Many of the facts about transfer of training in memory are clearly brought out in Fracker's study of the problem, which is one of the best that we have. Preliminary tests were given in memory for (1) poetry, (2) the order of four shades of gray, (3) the order of nine tones of different intensities, (4) the order of nine shades of gray, (5) the order of four tones—the major chord, (6) the order of nine geometrical figures, (7) the order of nine two-place numbers, (8) the extent of arm movement. Tests number 2, 3, 4, and 5 were given by a method which the author describes in the case of the four grays as follows: "The stimulator was arranged to expose each of the four gray disks for one-half second, an interval of one-half second being allowed between each exposure. . . . After the four grays were exposed, a blank remained before the observer for four seconds, then another arrangement of the four grays was given and another blank exposed. When the second blank appeared, the observer responded, giving aloud the order of the first group of four grays. After the third group had been exposed, he responded to the order of the second group, and so on through the series. In responding to the order of the four grays, the observer called the darkest gray, 4; the next lighter, 3; the next lighter, 2; and the lightest, 1." In the tests of nine tones, only four intensities were used, and arranged into groups of nine: for the nine grays, the four shades employed in experiment (2) were used. After the records of the test series had been taken, a training series was taken, using the four tones of experiment (3), and the method just described. Thus the training series was wholly identical in method with the series in the four grays, differing only in the use of tone-intensities instead of shades of a color.

It was found in the course of the training that all but two of the observers recognized a peculiar imagery, out of which a sort of mnemonic method was built. It is interesting to notice that none of them tried to improve their direct memory of the four tones, but all immediately translated the order of the group of tones into terms of position in space, of the serial names "4213," etc., or some other form of representative imagery. This is certainly a case of calling an easier type of imagery to the aid of a more difficult: it would be interesting to inquire if it was also partly due to a half-unconscious effort to enlist the aid of association. But the important thing for our problem is that we have here in the training series itself the development of what might be called a manufactured transfer. With every one of the observers who recognized a distinct method of remembering, the real training was not at all in memory for the order of four intensities of tone, but in memory for something quite different; and the four tones were only treated as symbols designating the order in which these artificial images were to be arranged. One observer had a system closely related to the content of the tests, for he imaged the loudest tone as close to his ear, the softest as placed some distance off, and the other two in intermediate positions; but another had a purely visual system, made up of different-sized dots arranged in a vertical line. There is certainly no identity between black dots and tones, nor can it be supposed that these dissimilar images function in identical neurones, since no one holds that the visual centers and the auditory centers in the brain coincide: the only real identity is found in the two abstractions of "difference in size" and "arrangement in serial order," which were common to the dots and the tones—that is instead of transference through identical elements, we have transference through community of an abstraction, which is transference by analogy. Such a method is naturally applicable wherever the analogy holds good, provided that no condition is arbitrarily introduced that interferes with the smooth working of the method, as in the case of the four tones different in pitch, where the tones were called "Do, Me, Sol, Do-2," in the responses, instead of being named, "1, 2, 3, 4."

How far this transference by analogy can be applied depends on the intelligence of the individual; on his ability to discover analogies. How far it will be applied depends again on his intelligence, his resourcefulness in devising new methods, his ability to recognize the limits of economy in transference. One observer may struggle along trying to apply his method by forced analogy, in situations to which it is not at all suited, while his more intelligent neighbor, recognizing that his method is wasteful in the new situation, will abandon it for a better method, even at some temporary loss in efficiency. Fracker's results illustrate both these points: that there is gain in transference by analogy, and that there is loss if the transference is carried too far. The former point, as I have shown, appears even in the results of the training series: it appears again in the final test series. Those who had developed a definite method in the training series, both improved most in the training, and showed the greatest gain in the final tests. Of the final tests, the four grays, nine tones, nine grays, and four tones could be handled by the methods developed in the training series, but the use of names instead of numbers to designate the four tones interfered very seriously with the application of this method to it, as several of the observers testified. The other three of the final tests to which the methods used in the training series could be applied, show in some cases a greater gain than was made in the training series—the training apparently transferred with more than hundred-per-cent efficiency. That there should be no loss of efficiency in the transfer need cause no surprise, for none of the observers was really training himself to remember the order of four tones differing in intensity. They all took the tones as symbols, possessing an obvious serial order, and trained themselves in remembering some sort of images in the order designated by these symbols. Any other set of equally understandable symbols would do just as well, as these experiments show.

The result with the test series of four tones is an interesting illustration of the tyranny of method. It was natural that stimuli so notoriously difficult to image distinctly as differences in intensity of sound, should be translated into other terms, but where the subject-matter is made up of differences in pitch, and such easy differences as the intervals of the major chord, it is unlikely that all of the observers were incapable of learning to work from direct imagery of the sounds, for anyone who can carry a simple tune in his head has sufficiently good auditory imagery to succeed with it. One did try it, but found that the notes tended to fuse into a chord—an unusual experience, surely, in the field of auditory imagery. The others all applied their previously formed methods—unsuccessfully, as I have already noticed, because names were used instead of numbers—and found this, which, for one of even moderate auditory imagery, was intrinsically the easiest of the four tests that resembled the training series, to be very much the hardest. The method transferred, where transference was a disadvantage.

In the tests essentially unlike the training series, the trained observers again showed superiority over the untrained control-group, which suggests that a transferable mnemonic system is not the only factor in improvement. The factors that influenced the essentially dissimilar tests, as Fracker points out, were: (1) the discovery that imagery is helpful. The special imagery developed in training may not itself be transferable, but experience with it suggests the idea of deliberately employing some kind of imagery. In the training series, imagery had been unconsciously developed, and only recognized later. (2) "The factor of attention and its control seems to be an important one in improvement and transference," being ranked second to imagery, by the observers. (3) Association: but this factor does not come out very clearly in the experiments. (4) Automatisms. These may either help or hinder in transference. They make a method less adaptable, but where the method can be applied in toto, or at least without change in the automatised factors, they are a distinct advantage. The great improvement in the four grays in the final tests, and the small improvement in the four tones, illustrate both points. In the former test, every automatism could be transferred; in the latter, the use of numbers in the response had to be broken up.

II. Sensory and Sensory-motor Skill. By this rather inadequate title I wish to designate the great group of functions —using the word in Thorndike's sense—that have much to do in a rather superficial way with things, and very little to do with ideas, or interpretations of things. Such are Thorndike and Woodworth's experiments on estimating areas and weights, in perceiving words containing certain letters, etc.; Squire's experiments on neatness; and tests made by various psychologists on localization of lines, on discrimination of pitches in tones and shades in colors. Even Ruger's experiments with mechanical puzzles belong mainly in this group, for, while they involve mathematical principles, and might be solved by direct application of those principles, yet it is doubtful if anyone has ever applied that method, and Ruger's observers certainly did not. They simply manipulated the puzzles more or less blindly until they fell on the solutions by accident. Experience became somewhat of a guide, but only in a rule-of-thumb sort of way. I shall consider the data in this field under three heads: (1) motor skill, (2) sensory skill (discrimination, accurate perception, etc.), (3) general— those activities which involve rather ingenuity than either fine motor co-ordination of especially accurate sense-perception.

1: Transference in motor skill. Of the numerous experiments in this field, most seem to have been concerned with transference of improvement in reaction times, where motor co-ordination is of the simplest sort. Most of the others have been of what I might call an "unreal" kind—such as learning to repeat the alphabet forward and backward, then inserting n after each letter (AnBnCn, ZnYnXn) to test for transfer of improvement from those as training series to the test series

AxBxCx, etc. They lead on the whole to the conclusion that the transfer of training in such work is very limited. A test much more comparable to problems of real life was made by Scholkow and Judd, who tested boys of grades 5 to 6 in school, at hitting a target under water. I quote their report: "One group of boys was given a full theoretical explanation of refraction. The other group of boys was left to work out experience without theoretical training. These two groups began practice with the target under twelve inches of water. It is a very striking fact that in the first series of trials the boys who knew the theory of refraction and those who did not, gave about the same results. That is, theory seemed to be of no value in the first tests. All the boys had to learn how to use the dart, and theory proved to be no substitute for practice. At this point the conditions were changed. The twelve inches of water were reduced to four. The differences between the two groups of boys now came out very strikingly. The boys without theory were very much confused. The practice gained with twelve inches of water did not help them with four inches. Their errors were large and persistent. On the other hand, the boys who had the theory, fitted themselves to four inches very rapidly." (15, p. 37.) There is one important difference in method, which no one has observed, between this and all the other transfer-tests yet published. Instead of taking the record of a single test with the water at four inches as the measure of relative improvement for the boys with and the boys without theory, the experimenters gave a fairly long training in the changed conditions, and measured the relative rates of improvement. The record for the first few trials at a depth of four inches is not given, but it would have shown a much smaller gain, at the best, for the boys with the theory, than the record showed as it was actually taken. If we compare the usual method of testing for transfer, with the "method of free reproduction" in association tests, then Judd's method in this experiment is analogous to the "saving method." Besides this point of method, there are two points especially important in the results: (1) without a certain minimum of experience, theory can afford no help; (2) given that minimum of experience, theory is transferable to all analogous situations, to great advantage.

Experience in every-day life bears out this conclusion. That athletic experience can and does transfer with a high degree of efficiency is a matter of common knowledge: experience in football often facilitates the learning of basket-ball; experience in baseball helps in tennis. This observation is not to be ruled out of court on the ground that the person whose experience seemed to transfer was only better in natural ability, for the one who began tennis, for example, without previous experience in other sports, sometimes proves his superior native ability by ultimately outstripping his opponent whose athletic training had given an initial advantage. The transference can be explained by the theory of identical elements. But I can speak with fuller knowledge in the field of music. Mastery of one instrument does make it easier to learn another, quite apart from the advantage gained by learning to read music and keep time. Mastery of two or three instruments gives a tremendous advantage in the early stages of learning a new one, though after this initial advantage, in which a saving of as much as two years' work may be made, then progress is no more rapid than for one of the same attainments who knows no other instrument. I shall cite one case which I had a chance to observe very carefully. An amateur violinist of good average ability, and given to theorizing on the principles underlying the rules of technique, took a few months' lessons on the piano. In laboratory tests his reaction times were found somewhat slow, and his accuracy in remembering movements of forearm and upper arm was not above the average. But his rate of learning on the piano was at first very rapid, scales were readily learned, independence of finger action, especially required in using both hands at once, was easy, and he acquired within two months considerable readiness at playing loud and soft simultaneously with different fingers of the same hand, and at playing simultaneously legato and staccato—in simple pieces, of course. The correct action for the staccato touch was learned in three lessons. Curiously enough, while the advantage of training had been with the left hand, that hand proved awkward and troublesome on the piano, while the right hand fell quickly into correct habits, and apparently was superior even in strength. This suggests that the direct muscular training acquired on the violin was the least factor in the transference, and that the gain was almost wholly due to a better understanding of the conditions of muscular training: particularly a greater power of sound self-criticism. The student had learned to recognize when an action "felt" right, and where to look for faults when it did not. It is further significant, that he showed least advantage from previous training, in the one place where understanding can least take the place of plodding work in muscular habituation: in learning to estimate accurately the distances on the keyboard for various musical intervals he had little advantage over an untrained student, and had gained but little fluency by the end of his period of study.

2: Transference in sensory skill. It may seem an abuse of words to speak of sensory "skill," since we think of skill as essentially motor: but ability to discriminate shades in color, differences of pitch, intensity, and quality in tone, length and form in lines in figures, etc., certainly is at least analogous to what we call skill in the use of the limbs and muscles. The experimental data in this field are not very satisfactory. Two of the most often quoted studies are that reported by Thorndike and Woodworth in 1901, and that reported by Coover and Angell in 1907. Since they come from what are generally regarded as opposing camps, we may reach something like reliable conclusions by checking them off against each other. Thorndike's experiments tested the gain in accuracy of judging the areas of various-shaped figures from 10 to 100 sq. cm. in size, of rectangles from 140-300 sq. cm. in size, and of various-shaped figures from 140-400 sq. cm. in size: after practising the observers on a training series in estimating the areas of rectangles from 10 to 100 sq. cm. in size. They also reported other experiments with lines and weights, resting on the same principle. The tests in ability to perceive words containing certain letters have to do with quite a different thing than sensory skill, and hence will not be discussed here. The results show an undoubted transfer of training, which the investigators explain as due to (1) acquisition of certain improvements in mental standards of areas; (2) learning to make allowance for constant error. "That there was no influence due to a mysterious transfer of practice, to an unanalyzable property of mental function, is evidenced by the total lack of improvement in the functions tested in the case of some individuals" (27, p. 276). Here we see, what we have already noticed in other fields, that the chief gain is rather in an improved power of the understanding to find short-cuts in dealing with material, than in an increased efficiency of the sense or senses themselves. Our instruments do not improve: we only learn to use them better. Those who do not learn to use their instruments—the muscles and senses—from practice, show little or no transfer of improvement from the practice. Thorndike and Woodworth explicitly recognize this. They remark: "With some subjects in some cases the new ideas or the refinement of old ideas produced by the training seem impotent to influence judgments with slightly different data." (27, p. 395.)

Coover and Angell tested the improvement in discriminating shades of gray, after a course of training in discrimination of intensities of sound. The fact that the control-group actually got worse between the preliminary and the final results, makes one rather uneasy about the reliability of the results: we should like a little firmer assurance that such is the normal effect in this kind of work, before accepting these results as final. But even allowing for this weak spot in the tests, it is generally admitted that they prove the existence of some transfer: the only dispute is as to how much they show. In explaining the results, the authors say: Improvement seems to consist of divesting the essential process of the unessential factors, freeing judgments from illusions, to which the unnecessary and often fantastic imagery gives rise, and of obtaining a uniform state of attention which is less than the maximum. . . . The factors in this transfer are due in great part to habituation and to a more economic adaptation of attention, *i. e.,* are general rather than special in character." (4, pp. 333-4.) Instead of speaking of the factors as "general rather than special in character," it is less ambiguous to say that they are central rather than peripheral; that the improvement is due to a better understanding of and use of the psychophysical organism—or that part of it involved in the process studied—rather than to a change in the constitution of the organism. Thorndike and Angell are at one on this point, though I believe they do not recognize the fact. Both deny the spread of training—to any great extent, at least—through a change in the physical factors (the muscles and senses), and both stress the importance of the mental factors. Their differences are in the view they take of some of the higher mental functions. For Angell, attention is one function; for Thorndike, it is many: in the one case, it can be thought of as functioning more generally than in the other. Concerning the question involved in this dispute, I shall have more to say later: for the present, the important thing to notice is their agreement that the chief factors in the transfer of improvement found in their experiments, are mental. The senses involved have not become appreciably finer, subtler, in their responses to stimuli, but the mind has learned better how to put them to work, and how to read their reports.

3: General. Transference in problem-solving. Under this heading I shall take Squire's and Ruediger's experiments on neatness, and Ruger's experiments with mechanical puzzles, as typical. Squire found in tests of children in the intermediate grades that efforts to teach the children neatness in the arithmetic papers brought about a marked improvement in those papers, but an actual decrease in both neatness and accuracy in language and spelling papers. The explanation is obvious when we reflect that improvement involves two factors, the will to be neat, and the ability to accomplish neatness. Neatness is not a characteristic virtue of the elementary grades, and when the teachers would pester the children about their arithmetic papers, the children naturally made up for it by slighting their other work, so long as nothing was said about that. The experiment should have been carried further. By dropping the emphasis on neatness in arithmetic, and turning the attention to the spelling papers, the investigators would almost certainly have found a marked falling off in neatness of the arithmetic papers—though not a complete return to the old standard—and would have found improvement more rapid in the new subject than in the former one. Given the will to be neat, the skill acquired in the work on arithmetic papers can perfectly well be transferred to work on other papers: but the amount of automatic, involuntary transfer from one activity to another is certain to be small. Ruediger partially recognized this fact, and made a series of tests on neatness, in which, besides working actively for neatness in one subject, the teachers continually brought the ideal of neatness before the children, though making no special allusion to the other school subjects. The result was an unquestionable improvement on the average in all subjects, though the improvement was greatest in the subject where it was emphasized. But while these tests found a half-unconscious transfer of the will to be neat, they do not attempt to discover how far skill in neatness can be transferred by conscious, deliberate effort.

Ruger's report on his tests with mechanical puzzles is full of instructive material on the learning process, but only his data and comments on transfer will be noted here. He reports three tests on the transfer of specific motor habits:

(1) "A subject was tested with a puzzle thrown in chance positions, then trained to approximately the physiological limit in handling four special but important positions. He developed no general rule to include his treatment of these special positions. Another subject was trained entirely with chance positions, in a series approximately half the length of the first subject's series. The second tests of the first subject showed no improvement over the initial results, and were inferior to those of the second subject. This failure to profit by the highly specialized training seems to have been due to the lack of a generalized rule of procedure. As it was, each chance position was first reduced to one of the four special positions and then the solution was proceeded with instead of being performed directly." (23, p. 18.)

(2) "A certain puzzle was so arranged that it could be presented in various forms. The manipulations for these various forms could all be comprised under a single formula.

This general formula could be deduced from any one of these special forms. A number of subjects were tried with this puzzle. As soon as skill was acquired in dealing with one form of the puzzle it was changed to another form. The subjects who developed the general formula during the solution of the first form were able to use the specialized habits built up in the first form in the second. Those who formed merely the special habits without developing the principle attempted to carry over the habits without modification and were greatly embarrassed by the change.

(3) " A subject was tested with a puzzle in a given form. Then all the motor habits necessary for the rapid solution of this form were built up by practice in the separate acts of manipulation involved. The elements were organically related in the successive forms of the practice series, so that the practice was not on the separate elements merely but on their connections. At the close of the practice series the subject was given the complete form, which was identical with that of the initial test. This form was not recognized as being related to the practice series, and the habits built up there were not brought into use.

" In general, the value of specific habits under a change of conditions depended directly on the presence of a general idea which would serve for their control."

This is fully in harmony, we see, with the principle already stated, that most, if not all, transfer is central, not peripheral. An idea or an ideal can be readily adapted, adjusted to the new conditions: a motor, sensory, or sensory-motor habit, if highly developed, must be taken over unchanged, or changed at the cost of much effort; while if it is not highly developed, little is gained by its transference. A new habit could almost as easily be built up.

The report just quoted raises the question: why do motor habits sometimes transfer when they should not, and not transfer when they should? The answer is fairly obvious in this particular case: the transfer resulted from a mistaken assumption of similarity in the two cases (see above, Ruger experiment 2); the failure to transfer (Ruger, 3) from non-observance of similarity. When we turn to every-day experiences, however, the problem seems more intricate, for we find cases of transfer occurring even against the will of the agent, and non-transference where the agent is actively trying to bring the habits into play which refuse to transfer. The solution of the problem is, I think, substantially the same as before, except that in place of conscious perception of similarity, we have a more or less unconscious reaction to similarity, which calls up the seemingly most appropriate "set," and with it, the habits which long-continued practice has associated with it: the undesired habits thus called in crowd out the other habits whose transfer is desired. Apparently we can only approach just so close to the groove of an established habit without slipping in, willy-nilly.

We conclude, then, that "improvement of functions" by training is wholly, or almost wholly, central, not peripheral —not a new doctrine, certainly, but one whose consequences have been often overlooked even by those who hold it. Memorial work does not train the memory either as a whole or in part: it merely stamps in certain impressions. Motor work does not train a "motor function"; it only forms certain motor habits, or tendencies to repeat the specific acts that were performed in that work. These habits do not transfer even to the most similar situations unless the similarity is taken for identity; and in that case they transfer unchanged: nor do they have any immediate effect in making other habits easier to form. But in doing motor work, or memory work, we can also observe how it was done, and use the "know how" thus acquired to make our next bit of work more efficient. Experience can teach us how the memory behaves, just as it teaches a mechanic the behavior of his material—wood, iron, tin, or stone—and this understanding of the behavior of memory, muscle, the senses, and thought, constitutes the real and only direct training possible in any of these fields of work. In its applicability, this training is universal, for memory behaves in substantially the same way whether dealing with nonsense-syllables or philosophical prose: the laws of muscle-action are essentially the same whether the work be driving nails or setting a bone. Very few of us are penetrating enough in our analysis of these laws, or judicious enough in their application, to secure this universal transfer: we only accomplish a very limited transfer, because the strangeness of the subject-matter, when we get too remote from the material with which we had our original experience, baffles our attempt to discover the community of underlying principles between the two. It is easier to work up our experience clear from the beginning, again. But the possibility of universal transfer is always with us: how extensive a transfer any one can achieve from a given bit of experience depends on the amount of intelligence which he devotes to the task.

In accomplishing this transfer of training, if one can use habits already formed, as components in the forming of new habits, he saves just so much in the process: thus we have an indirect transfer-value of existing habits. Where one has a countless number of habits already formed, as in the use of the hand and arm, or a countless number of memorial impressions established, as we all have in our mass of knowledge, this transfer-value is of tremendous importance for the formation of a new habit, or the establishment of a new memorial impression: where the transfer is only from one small habit or memory to another, the transfer-value is relatively insignificant. But in any case, the use of intelligence is necessary to realize the transfer-value: habits can rarely be taken over bodily and unchanged. They must be adapted, and in adapting them, one must be able to distinguish essential from apparent similarity and difference in the two situations. A wrong diagnosis results in misadaptation to the new case: habits and parts of habits transfer that should not, and those that should transfer fail to do so.

All but one of the tests for transfer that have come to my notice, have made one serious error in method: that one is the experiment by Judd and Scholkow, mentioned above (p. 357). In actual life, the thing of value is not the gain in efficiency found at the very beginning of a new activity, due to training in something else; but the gain in improvability. Not how much unconscious, automatic transfer has already been effected, is the question of importance, but how much transfer can one effect by the use of intelligence and deliberate effort, given time to adjust himself to the new situation, to seize its points of essential similarity to the old situation, and of essential difference. Therefore, instead of taking the record for immediate improvement in the final test series, as the measure of transfer, experimenters should after the training series, make of the final tests a new training series, and compare the rate of improvement for the trained group and the control group in the final test-training. In experiments involving such things as simple reaction-times, we should expect very little difference, for they give little scope for the use of intelligence: in tests of greater complexity, such as, say, transfer from typewriting to telegraphy, we should expect a marked difference. The more intelligent should at first greatly outstrip the control group, then settle down to a normal rate of improvement, keeping their advantage, but making no further gain over the control group. The less intelligent should in some cases lag behind the control group, from transferring the wrong habits, which would interfere with progress.

Learning and Transfer in General.

The results found in these experiments are of only symbolic value for education: they do not test the activities that mean most for life, but only very small analogues and elements of the activities and abilities that are supposed to distinguish a leader from a follower, a cultivated man from an uncultivated, a master from a tyro. The bigger question now confronts us: what is education: can one acquire improved power for meeting novel situations, as well as greater familiarity with old ones; can college training fit for business, and if so, how; have different subjects their peculiar cultural value, and if so, in what does it consist? The remainder of my study will be devoted to the principles on which rest the answer to these questions.

Nearly, if not quite, every fact and principle that has any bearing on the question of formal discipline has already been noticed by writers on the psychology of learning. The "one thing needful" is that these facts and principles should be brought together, their relations to each other made clear where they have been overlooked, and the whole reduced to coherence. In attempting this task, I shall follow very largely Thorndike's Psychology of Learning, probably the soundest and certainly the completest work that we have on the subject. For clearness and convenience of reference, I shall preface my discussion with a brief abstract of his account of the mechanism of learning. He distinguishes the following laws of learning:

I. Three main laws of learning.

(a) The law of readiness: When any conduction unit is in readiness to conduct, for it to do so is satisfying; not to do so is annoying. When it is not in readiness to conduct, for it to do so is annoying.

(b) The law of exercise:

(1) The law of use: "When a modifiable connection is made between a situation and a response, that connection's strength is, other things being equal, increased." (26, p. 3.)

(2) The law of disuse: When a modifiable connection is not made between a situation and a response during a length of time, that connection's strength is decreased." (26, p. 4.)

(c) The law of effect: "When a modifiable connection is between a situation and a response is made and is accompanied or followed by a satisfying state of affairs, that connection's strength is increased: when made and accompanied or followed by an annoying state of affairs, its strength is decreased." (26, p. 4.)

II. Five secondary characteristics of learning.

(a) Multiple response to the same external situation. This is the universal method of meeting a new situation: we try various new responses until we find one that satisfies. In animal learning, the responses are almost purely blind, random movements; in man they may be guided, stimulated, or checked in various ways, but the principle remains the same. It is only though this principle that we can break away from our plexus of habits, meet new situations, and form new habits.

(b) Attitudes or "sets." These determine the general character of the multiple responses aroused by the new situation, and what response will be selected out of those appearing. The relation between the set in a given situation, and the laws of readiness and effect, is very intimate. One's set determines what conduction units shall be in readiness to conduct; and this determines what responses will satisfy or annoy.

(c) The partial or piecemeal activity of a situation. One or other part of a situation may be prepotent in effect: in more popular language, we tend to analyze situations, and respond to those parts only that seem important, or convenient to take first.

(d) Assimilation of response by analogy. "To any new situation man responds as he would to some situation like it, or like some element of it." (26, p. 28.) "Were the situation so utterly new as to be in no respect like anything responded to before, and also so foreign to man's equipment as neither to arouse an original tendency to respond nor to be like anything that could do so, response by analogy would fail. For all response would fail. Man's nature would be forever blind and deaf to the situation in question." (26, p. 29.) To what experience any situation shall appear similar, depends on the man and his previous education. Coal dust has a similarity to diamonds in the mind of a chemist: to an uneducated man it would be similar to something of a quite different sort.

(e) Associative shifting. This depends on the same principle as response by analogy. We readily learn to make the same response to part of a situation that we have done to the whole: and we may come to lose sight of

> the whole in our response to the part. The very existence of language is a result of this principle; the danger against which we have always to guard of mistaking the word for the thing, is the result of a tendency to make the associative shifting too complete.

This analysis of the mechanism of learning may be left without comment, since the points on which it might be challenged are not relevant to the present study: but certain other points in Thorndike's treatment of the psychology of learning, which have a bearing on the question of formal discipline, need to be criticized and supplemented. These are his discussions of (1) habit, (2) thinking, (3) functions, (4) attention. On all four of these subjects Thorndike is vague—purposely, as I take it, from unwillingness to introduce any speculative question or anything of doubtful validity into his book—and consequently I write here in constant danger of misinterpreting and misrepresenting him. But psychological thought has progressed far enough to make possible something like a definite determination of what these four terms should mean.

(1) Habit. "To one accustomed to the older restricted view of habits, as a set of hard and fast bonds each between one of a number of events happening to a man and some response peculiar to that event, it may seem especially perverse to treat the connections formed with new experiences under the same principle as is used to explain those very often repeated, very sure, and very invariable bonds, which alone he prefers to call habits." (26, p. 28.) Not exactly perverse, we might reply, but rather confusing. The difficulty seems to lie in this: Thorndike calls the laws of learning which have just been given, "laws of habit," and then apparently assumes that every process which obeys those laws is a habit. But they are laws of habit only in the sense that they are the mechanism by which habits are formed: every process which obeys those laws has in it the makings of a habit, but has not yet become one. Once let the process became a habit, and several of these laws fall into abeyance. Multiple response, for example, is supplemented by the uniform, unvarying, and even undiscriminating response of the fixed habit; associative shifting can only be accomplished at the expense of the habit; and the principle of assimilation is only a source of embarrassment, unless one is able to adapt—that is, partially break up, and re-form—the habit thus transferred. What, then, is a habit? A habit is a tendency to repeat an action which has often been performed before. So far as the action has become habitual,

it will be repeated unchanged. Habits and memory are essentially one, arising from the universal tendency of the neurones to retain impressions. Habit and memory are static: a habit cannot form itself, nor can it form another habit. The power that forms it must come from outside itself. That power is the whole personality, feelings, impulses, thought: most active of these is thought.

(2) Thought. As habit is a fixed mode of response to an old situation, so thinking is a flexible, tentative response to a new situation, having as its purpose the discovery and selection of the best response. Having found this response, the organism generally turns it into a habit, and leaves thought free to attack another problem. Thought is, in terms of Thorndike's analysis of learning, the action of the principle of multiple response, under the guidance of a 'set:' it is constantly trying to put things together in a new way, looking for new relations, and in this effort, makes use of its previous acquisitions, habits, memories, established associations, as material. No doubt thinking is much more than this, but it is at least this, and we must carefully distinguish between thought, which is active, tentative, flexible, directed toward the new, and habit, which is unprogressive, stereotyped, a mere deposit of the past—though none the less important for that. Thought may abdicate to habit, and in great measure does in most adults—perhaps completely in some—but thought is not habit, though it is such stuff as habits are made of. There are no habits of thought, strictly speaking: what are so-called are habits that condition thought by barring its progress in some directions, and consequently directing it another way; and also habits which constitute the material with which thought works.

(3) Functions. "Let us use the term 'Mental Function' for any group of connections, or for any feature of any group of connections, or indeed for any segment or feature of behavior, which any competent student has chosen or may in the future choose to study, as a part of the total which we call a man's intellect, character, skill, and temperament. By so catholic a definition we shall have a convenient term to mean any learnable thing in man, the psychology of whose learning anybody has investigated." (26, p. 57.) Such a pragmatic use of the term is of course perfectly legitimate, but we shall want to know more definitely whether a function as such has an organic unity, a nucleus in some innate character and a capacity for independent growth, or whether it is a mere 'segment of behavior' chosen more or less arbitrarily, for convenience of study. In the former case we

have a great group of little faculties in the mind: in the latter case the mind would be from one point of view an aggregate of atoms; from another point of view, a unit. If functions are faculties, we should expect much transfer in a small field, but no transfer to other functions: if they are not, then possibility of transfer should be as wide as the mind itself, and the immediate spread of training should be practically nil. Thorndike seems to lean to the latter view, but occasional remarks by him and others of his school suggest a tendency to regard functions as faculties. For example, Ruger asks: "Is there a single function for 'transformations in three dimensions,' or are there numerous special functions?" (23, p. 26.) Thorndike and Woodworth say (27, p. 248) "the function attention, for instance, is really a vast group of functions": from which but one inference is possible, that there are as many "attentions" as there are other functions, and that each "attention" is attached exclusively to one of these functions, since no function can act without attention. This leaves us in doubt as to Thorndike's position. But considered on its merits, the second view proposed, denying to "functions" any independent, innate origin, seems the preferable. On this hypothesis, a function is to be regarded as a group of habits and a body of knowledge which have a certain unity from serving the accomplishment of one general purpose. It centers, not round an internal, psychic nucleus of some small special ability, but round the external nucleus of an end to be attained. It may, however, acquire a unity and an independent existence much resembling that once attributed to a "faculty," through becoming formed into a constellation or complex. Thus "mathematical ability," if the study is pursued for a long time and without care to relate it to the rest of life, may be organized into a separate complex, dissociated from everything else—it becomes a "water-tight compartment."

One important conclusion partly follows from, partly supports, this hypothesis. It is this: within the field of pure intellect, there are no special abilities. So far as power of thought is concerned, any individual is equally well equipped for mathematics, philosophy, or fiction-writing: the *Anlagen* which determine anyone's special abilities and interests are all extra-intellectual—emotional characteristics, memory-type, motor control, and environment are among the most powerful determining factors. This conclusion rests mainly on physiological and genetic grounds. Physiologically, uniformity of intellectual power within the individual is to be assumed for the same reason that we assumed uniformity of memorial ability. As memory has for its basis the power of the neurones to resist impressions, so thought has for its basis the conductivity of the nerve-fibers in the brain. The better one's nerve-fibers conduct, the more fertile will his mind be in new combinations—or ideas—and the more often will he be able to hit on a good idea. There is no reason to suppose that this conductivity varies in different parts of the brain, while the fact that in thought we can summon what little we do know in uncongenial fields, and use it as readily on occasion as we can use knowledge from our favorite fields, indicates that the brain is an equally efficient conductor in all its parts. Genetically, it is not easy to see how specializations in the field of thought should occur. We can easily understand sight-centers, auditory centers, speech-centers, hand-and-arm centers; but how explain mathematics-centers and philosophy-centers: or, taking smaller " functions," centers for puzzle-solving, and centers for judging rectangles of approximately a given area? The facts of learning are much more easily explained without supposing such " centers." This explains in a new way the correlations which Hart and Spearman have pointed out, and for which they have postulated a " general factor." Granted that different parts of the brain are equally efficient in the quality on which intelligence depends, they will be correlations without the help of an ubiquitous " general factor."

(4) Is attention one function, or a group of functions If our contention concerning other functions is granted, then attention must be one function, for it is the prerequisite of every activity, and if it does not attach, in separate fragments, to separate innate faculty-like functions, it must attach instead to mental activity in general: that is, it must function as one. Two other considerations support this view, even if we supposed the innate origin which we have just denied, of separate " mental functions." (a) Attention can be concentrated. If there were a great variety of separate " attentions," the amount of attention available for any one function would be strictly limited, and show very little variation. (b) Supposing attention not to be one, the " attentions " belonging to two unrelated functions could work simultaneously without interference in consciousness: the more remote from each other the two functions were, the less would they interfere. Instead of that, we find that we can attend at one instant only to so much material and of such a sort that it can be contemplated as a unit: the more unrelated an idea that tries to crowd in, the more distracting its influence.

The Things That Transfer

I. Knowledge and Ideas. The distinction in meaning between " knowledge " and " ideas " may be caught by comparing the phrases " a learned man " and " a man of ideas." Taking the suggestion from these phrases, we may define knowledge as what one learns from others; and ideas as what he works out for himself. By this definition, what were ideas to Plato or Kant, become merely knowledge to me, unless I reconvert them into ideas by working them out for myself. The distinction is vital, for what we retain as knowledge is never more than what appears on the surface—we can reproduce it all—while what we possess as ideas have behind them the richness of the thought which went into them—the least part of an idea appears on the surface. Consequently, while a bit of knowledge and an idea may look exactly alike, they are vastly different. To Kant, the Critique of Pure Reason represented the fruit of years of thought: a sentence of it might stand for whole volumes. To us, if we only read it to find out what he said, it will be little more than, in Hamlet's phrase, " words, words, words." We can only win from it something of the significance it had for Kant, by getting into sympathy with his point of view, putting ourselves into his place, trying to understand why he held this or that position, and thinking his thoughts over after him. This is the creative reading which Emerson urges upon us. It by no means involves even temporary assent to the doctrines of the author whom we happen to be reading, but it does involve recognizing that he was human ' of like thoughts with ourselves,' and reading his work sympathetically, as the honest effort of a human mind to express the thoughts that came to it.

Both knowledge and ideas are capable of transfer: but knowledge can never transfer of itself. It must first be worked up into ideas—that is, adapted, re-formed and reorganized, for the purpose at hand. We see this impotence of mere knowledge, everywhere: we all know boys whose knowledge of physics coexists with methods in their everyday mechanics that go back to the cave-men; girls to whom chemistry and cooking have no relation. I know one excellent teacher of geometry who on attempting a little amateur carpentry never thought of using the principle of the right triangle to get the length of his rafters and the proper bevel of their ends; but set two timbers up on the sills at what seemed an acceptable pitch, got someone to help hold them, and marked with a pencil where they crossed. A little thought might have suggested from his knowledge of geometry the principle which trained mechanics, though themselves ignorant of geometry, have been taught to use: but human nature seems prone to make the hands save the head, instead of making the head save the hands. Anything to get out of thinking.

This points to the true nature of the gap between theory and practice, and how it is to be bridged. Theory is a statement of the relations between one bit of experience and another: and as soon as it loses touch with the experience out of which it grew, it becomes meaningless. The "mere theorist" is not even a theorist: he is only a depository of theories worked out by others, which to him are merely knowledge. But he has this advantage over the "practical man" who knows no theory: let him once wake up to the fact that his knowledge has meaning when brought into contact with life, and he has the store of knowledge already to be worked over into ideas—into power. This is a partial justification of the school, for giving so much of its time to teach theories which can find little or no contact with the pupil's present experience. The pupil is not necessarily the worse off for possessing knowledge which does not relate to his present experience: while he is far better equipped for the future time when his knowledge will become significant, and if he is alert, the very possession of knowledge which he cannot relate up to life, will of itself challenge and enrich the assimilation of his school-learning to experience. But this consideration in no way justifies the school in accentuating the break between theory and life. We may frankly recognize that much of the subject-matter of our school studies—even history and geography—will not reach its highest significance to the pupil until years afterward, and that we need not worry over the fact: but we must make so much of it as we can relate to his life, or, if he is an average boy, the idea will never dawn on him that school-learning can be applied to every-day problems. Learning remains to him a thing apart.

II. Attitudes and Ideals. The *Aufgabe* and the *Einstellung,* the controlling factors in all thought, are for that very reason, controlling factors in all transfer. In studies of learning, it is usual to bracket the two as parts of one process, and then focus attention mainly on the *Einstellung*—quite naturally, because only through the *Einstellung* does the *Aufgabe* get results. But in a study of transfer, the distinction between the *Aufgabe* or goal-idea, and the *Einstellung* or "set," must be kept clear.

(a) The "set." The set is the bondservant of the goal-idea, the adjustment which the organism makes in obedience to that idea. Any such adjustment is to be counted efficient only in proportion as it gets the results called for by the goal-idea. But any given "set," if often enough assumed, can become habitual, and so lose its intimate dependence on the goal-idea. Then we have something that looks very much like a formal habit. As in the humbler realm of activity, conscious, deliberate reaction to a new stimulus turns into habitual, automatic reaction to the stimulus after it has been often repeated: so in the realm of purposes and adjustments to them, the purpose at first determines the adjustment, but at last, if we often meet the same situation with the same purpose, the adjustment becomes automatic, and may even conflict with the purpose, while it will certainly persist without the help of the purpose. A page from my own experience, which many another language-student in our country can match, will serve to illustrate. In college, I studied my texts in foreign languages primarily for the purpose of being ready for translation in class. As I gained some familiarity with the languages studied, I acquired the habit of reading merely to make sure that I could translate when called upon, only passages or words that required working out or looking up, attracted my attention. Passages that contained no difficulties were passed by with a sort of subconscious comment, "yes, I can do that;" and without thought of the subject-matter. The result is that since my college days, now that I read for subject-matter, I find it almost impossible to get any connected idea of the content of a book in a foreign language until the second reading, and often the easier the text, the less I get. I acquired in college what Thorndike calls a "habit of neglect"—learning to neglect the subject-matter, because class-work made no call for it—and the habit has stubbornly persisted in spite of constant effort to break it up.

These crystallized sets, which have declared their independence of the parent goal-ideas, are the most important of the so-called "habits of thought." A set, whether become habitual or not, forms during the period of its dominance, the channel within which thought must flow: become habitual, it acts as a unvarying controller of thought in the presence of situations which call up the given set. A single set, or a small group of them, may after a period of long habituation, so dominate the mind that thought dares not and cannot leap their bounds. Thus the mathematician, the historian, the financier, the specialist in any line, may so firmly acquire a set appropriate to his own line, and be so innocent of any other forms of thought, that he transfers this one lone set of his to everything that he does. More precisely, this habitual set often makes the man unable to see facts and values that lie outside the sphere of his particular work. There are lawyers in whose minds the statute law usurps the place of the moral code: and another case in point is the business man who thought that he had struck a death-blow to literary culture by arguing that knowledge of Shakespeare had never helped anyone to win a speculation on the stock exchange.

The set transfers more readily than other kinds of habit, because it is attached rather to the general outline of a situation than to its full concrete reality: thus a far wider variety of situations occur that are, so far as concerns the elements evoking the given set, identical. For example, one who acquires the habit of contradicting people, needs only to encounter a statement of fact or opinion in conversation, and his habitual set is at once called up. The statements to which he reacts at various times may be as unlike as day and night, yet they are identical in form, both being assertions. Let the medium of conversation be questions, concealing the speaker's opinions, and the habitual set of the contentious person is helpless to act. The reaction was to the form of the remarks, and changing the form, we evade the reaction.

(b) The goal-idea. From its very nature, the goal-idea cannot become habitual. It is essentially an act of will, and though we may habitually do a thing, we cannot habitually will a thing. Just so far as habit enters in, volition drops out: it is no longer needed. So when a set becomes habitual, the goal-idea to which it belonged fades out, and is very often lost sight of. This is a valuable labor-saving device, because it saves us from the necessity of thinking out our purposes anew whenever we meet a situation: but it is also dangerous, if not carefully used. In any occupation which involves much routine—and most do—one is in great danger of making a fetish of things which were originally done for a purpose, but have become so fixed from constant repetition that they are at last done automatically, worshipped as ends in themselves, and may even serve to defeat the purpose which they should have served, but which, now lost sight of, can gain no respect. School discipline, hospital rules, legal procedure, contain endless illustrations of this irrational worship of form due to divorcing the set from the goal-idea.

Sets may be taught; goal-ideas can only be evoked, brought to consciousness. What one wants is an expression of what he is; but one may not be at all clear as to his own nature, nor as to his own wishes. The great business of education is to help him find himself, to help him to understand what he is, and what are the best means of realizing fully the possibilities of his own nature. One may very easily choose the wrong intermediate goal-ideas, and so defeat the end which he wishes to serve. Education, in preparing him against this, does in a very important sense teach him goal-ideas, but only, as said before, in the sense that it evokes them from his own nature. But school education very largely fails in practice to do this, because it has very little thought of the individual, and still less of such intangible things as purposes and ideals. Routine and facts are its mainstay. It can and does, however, through the knowledge which it gives, furnish a broader basis from which those who have come under its influence can work out for themselves more surely what their aims are and should be; and we must recognize that too much guidance here is as bad as too little. Every one must " work out his own salvation," or he will be the weaker for not having done so.

Ideals are the chief priests in the hierarchy of goal-ideas. What his supreme ideals are no one can say, for they have their roots too deep in the nature of his being. One who could define his ideals could give a complete analysis of his own nature and character: and the unfailing curiosity of everyone about his own powers and his own traits of character, his interest in what others have to say about him, is an index of the uncertainty with which he gauges himself. But if we can never attain a final statement of our ideals, and may even in trying to do so state the very opposite of the truth, yet we can sense them dimly, and feel them with enough certainty to work toward them. Education of the right sort can enable us to become more clearly aware of these ideals which we dimly sense: education of the wrong sort can blind us to them completely. But in any case, everything that we do is at bottom directed toward the realization of these ideals; or was in the beginnings, before it became, as a habit, independent of all aims and ideals, because independent even of the will.

Goal-ideas and sets alike can transfer, but the involuntary transfer of a habitual set is always in response to a formal, superficial identity between situations, which may coexist with a very essential difference in other respects, which makes the transfer mischievous. The transfer of a goal-idea is necessarily voluntary, through discovery of analogies between situations. It may be often mistaken, but the more clearly one understands his own aims and ideals, the more perfectly adapted will his transferences be. If he learns to think clearly, and gains an understanding of his own purposes in life, he is equipped to meet any situation, not necessarily in the best possible way, but in a better way than he otherwise would; because he is able to bring his past experience, thought, and decisions, to bear on it.

III. Reasoning. Reasoning always involves—and is—dealing with some kind of subject-matter, and consequently requires familiarity with the nature of the subject-matter dealt with, and adaptation to it. The kind of reasoning that succeeds in mathematics, will fail in historical study. It also requires a considerable stock of knowledge in the given field, for reasoning is very much like the process of digestion—it cannot go on without something to digest. But beneath the difference in reasoning processes consequent on difference in subject-matter, and beneath the conditioning fact that we cannot reason without knowledge to base our reasoning on, there is an essential similarity between reasoning processes even in the most unrelated fields. Any extensive discussion of the nature of reasoning would be out of place here, but we must notice what is the effect of practice in reasoning, and when and how it may transfer. Practice may have its effect in three ways: (1) it develops the so-called "habits of thought"—habitual sets, and perhaps "habits of neglect of fatigue and discomfort"—and thus relieves the strain on the voluntary attention, setting it free to focus more directly, on the thinking process itself. (2) It may improve one's familiarity with his subject-matter. This is of the very first importance. As one can only learn by experience to recognize objects under the microscope from the pictures of them in books, so it is only intimate acquaintance with whatever the mind has to consider, that enables it to grasp the significant points, and distinguish and ignore the insignificant. (3) Practice may bring one to an understanding of "how it is done." This is not a matter of habituation, but of grasping the idea that the procedure employed makes a difference in the results. A man of sufficient genius might learn, from a single act of reasoning, enough to build up a whole system of logic—but no one has ever done it, of course. We can, however, supplement what we learn from first-hand experience, with what others have learned: and our books on logic, our scientific induction, our mathematical deduction, enable us to profit by the experience worked out by scores of great men, living generations apart. Practice, then, is supplemented by what we inherit from the experience of others, to an extent which we wholly fail to realize, in giving us an understanding of method in thought. But it must be clearly recognized that books and instruction can only supplement and guide experience. We learn from them of devices which would not have occurred to us, and we learn to look where without guidance we might not have thought of looking, for significant principles in our own procedure: but a device which we cannot use, a principle which we do not recognize in our own experience, is meaningless to us. We do not learn to reason by studying logic, though it may help us to understand some facts about our reasoning.

Now the question is: How far can practice in reasoning transfer? Taking in order the three main effects of practice just noticed: (2) The "habits of thought" may transfer involuntarily, wherever situations occur that are formally enough like those on which they were formed, to call them into action; or they may be voluntarily transferred and adapted, because found useful. Thus one who has trained himself to think in mathematics, in philosophy, and in biology, deliberately transferring his acquired habits, has in consequence developed habits flexible enough—or rather, perhaps, generic enough—to apply with a great saving of effort to any new field. But if the thinking in all three lines is conducted with no thought of relating the processes, we have "water-tight compartments" again. If, taking the third alternative, one tries to transfer his habits unchanged, he fails in yet another way. Pascal puts very clearly how this works in his own favorite subject: "Geometers never see what is before their eyes. They are brought up among the principles of science, clear and tangible every one; and all the arguments they employ have been carefully tested beforehand. Hence they are puzzled when they have to deal with evidence of a different kind. Here the points are almost imperceptible; they are not so much seen as felt; a man will hardly be got to notice them at all, if he does not do so naturally. They are so numerous and delicate that the very nicest judgment is needed to seize them and draw the right conclusions: for they cannot be set down in order, like the propositions of mathematics. The mind must take them in at a glance, rather than by any conscious process; geometers only make themselves ridiculous when they insist on applying their axioms and definitions to matters incapable of such handling. Not but what the mind does reason about them after a silent, instinctive fashion of its own, beyond the power of most to grasp, and of any to explain."

(2) Familiarity with subject-matter is of course useful only

so far as the subject-matter itself enters into the work of other fields. But we very readily overlook even the extent to which the subject-matter applies: the self-same fact looks very different in school from the way it looks in a business office; and very different at church on Sunday than at work on Monday—and we do not recognize its identity when it puts on a different dress. Consequently we lose valuable transfer-possibilities, learning useful facts only to forget them again, because we did not learn them well enough to recognize them in a different setting.

(3) Far the greater part of transfer-possibilities in reasoning, come under the heading of experience in methods. Even transfer of habits, and of the use of subject-matter, must be presided over by this understanding of the basic principles of thought, to get the best results. By this understanding of the basic principles of thought, I do not mean the kind of conscious evaluation that could be worked up into a book on logic; but rather the instinctive grasp—analogous in a way to vigor of conscience in morals—on which the conscious evaluation of principles must rest, and which can exist without that conscious evaluation. No course of study can infallibly evoke this instinctive grasp: any subject may do it, if the subject appeals sufficiently to the student. Dewey had this partly in mind when he said: "Any subject . . . is intellectual, if intellectual at all, not in its fixed inner structure, but in its function—in its power to start and direct significant inquiry and reflection." (7, p. 39.) At the same time, some subjects are far more effective than others in this respect, owing to their fixed inner structure, *if* they can be made to appeal: because they can afford the student a far wider variety of "significant inquiry and reflection" in a more concentrated form.

IV. Moral Judgments. The teaching of morals is the most baffling of all problems in education, and the few remarks that can be made here can scarcely hope to add much toward its solution: but since transfer in and into the realm of morals is one of the most important things that the doctrine of formal discipline has to deal with, we must face the problem, were it only to confess defeat. In dealing with moral education, one principle may be laid down as fundamental. If, and so far as, we can influence morals through intellectual training, that is, for the school, at least, the best mode of attack. This is true for several reasons. In the first place, it relieves the serious difficulty met in finding teachers who can give direct moral training. A teacher who inculcates, by command of the school board, moral principles which find but a small place in his own life, can scarcely avoid making the instruction seem a mockery to his pupils: yet in selecting teachers, it would only put a premium on hypocrisy and time-serving, to go into their moral qualifications more minutely than we now do, in demanding that they measure up to certain broad, easily ascertainable standards. The roots of character lie too deep to be reached by any objective tests: and it is so easy to "assume a virtue if you have it not," with sufficient verisimilitude to deceive the average man, that we could scarcely expect moral tests to improve the personnel of the teaching profession, especially since every vigorous character would resent them, and leave the profession by the shortest route, rather than submit. In the second place, there is always danger that direct moral teaching will become either so aridly intellectual that it will have no meaning in terms of action, in the children's minds, and may even rub the bloom of their youthful enthusiasms; or else so sentimental and goody-goody as to repel the sturdier characters, and confirm the others in their priggish tendencies. Again, direct moral teaching must have to do very largely with particular acts. People demand tangible results, and this is the easiest way to get them: and besides, only a rare teacher could deal with anything like moral principles, without talking over the pupils' heads. The result, then, of the usual moral training must be to develop a purely formal morality, consisting merely of particular habits of behavior. An extreme picture of what such moral training can do in an earnest, conscientious man, is seen in Victor Hugo's character portrait of Javert.

If we can reach morals through the intellect, giving a firm basis for a sound morality, but leaving each one to work out his own character, we avoid all these difficulties. Everyone wants and needs, of course, the help of others in forming his character, but he naturally seeks this help personally and privately, not through the medium of class work. Can we find this desired intellectual basis, to be taught in school, for the formation of character? In several ways, I think. First, through the "intellectual conscience." This roots less deeply in sentiment than does the moral conscience, and so is less liable to perversion, and easier to reach. Intellectual honesty, for example, is simply freedom from self-deception. Generally speaking, no one is eager to deceive himself, so the teacher has little trouble in enlisting the will. He needs only to prepare his pupils against the errors into which thought readily falls, and so far as they learn to think soundly, they will be intellectually honest. But one who is honest with himself is far more likely to be honest with other people, because he has acquired the technique of honesty—and a great part of the dishonesty in the world is due to sheer inability to tell the truth—and because honesty seems to him more a thing to be desired, than to one in whose mind the distinction between truth and falsehood is less clear.

A second way of reaching morals through intellect has already been foreshadowed, in the section on ideals and goal-ideas. The laws of morality are only means to an end: the realization of ideals. One who has learned to orient his intellectual aims by his ideals is the readier to guide his conduct in the same way. Let him link up his moral principles with the rest of his life, and they will gain both in dignity and compelling power. Duty gets a richer meaning; conscience is recognized as a friend to be cherished. This approach, then, through intellect to morals, depends on bringing ideals to conscious recognition, and developing the judgment, as a power of selecting the right means to realize ideals.

A third means of moral influence, less distinctly intellectual, but a purer case of transfer, is through pre-forming moral judgments. We see ourselves as other see us, much more clearly, if we have first contemplated and judged the given act in someone else—even in a character of fiction. The parable of the ewe lamb, which the prophet Nathan used to bring David's crime home to him, is an illustration of this. If, then, through stories, children in school have a chance to judge coolly and without personal bias certain modes of behavior, those pre-formed judgments are there as a basis from which to judge their own behavior. The extent of the transfer depends on how fully they realize the identity between their own acts and the others on which they have passed judgment.

But one caution must be added: if we substitute the approach to morals through the intellect, for the direct approach, no one must infer that all reference to morals should be banished from the schools. It should not be made a subject of formal instruction, because morality at its best possesses a spontaneity and naïveté which formal instruction tends to spoil: but on the other hand, to avoid all reference to it as taboo would be just as bad as the other extreme of lugging it in by force wherever possible. Morality is as natural to humanity as is breathing, and one should feel as little constraint in speaking of the one as of the other. Any departure from spontaneity, in either direction, will throw an atmosphere of unreality around the whole subject, in the minds of most children.

The Mechanism of Transfer

The reader may have noticed that throughout the whole of our study thus far, we have emphasized the fact that under certain conditions, knowledge and training may transfer: it remains to inquire what principles determine whether or not this transfer will come about. These determining factors are two, the one functioning as the medium, the other as the motive power.

I: The Law of Analogy. It is a commonplace to say that one cannot expect to meet any two situations that are exactly alike; yet we are constantly treating situations as identical with other situations which we have already met, and we treat still more situations as sufficiently like something in our past experience to be met in the same way. The moral code, the legal code, and any kind of general rules or principles are only possible because of this tendency. But how and why do our minds come to behave in this way? It is due in the beginning to the fact that we perceive incompletely, and quickly forget even the greater part of what we perceive. Consequently situations that are not alike look alike to us, through our not noticing their points of difference. Some kinds of similarity, as has been noticed earlier in this paper, will set off habitual or instinctive tendencies to respond, without the interference of conscious volition, or even in defiance of it. These give us the pure " functioning of identical elements " which has been so widely held to be the sole explanation of apparent transfer: the elements may not be objectively identical, but they are subjectively so. But as our observation becomes more accurate and our knowledge more extensive, we come to detect differences in situations that once looked alike, and where we once through ignorance treated situations as wholly identical, we now for convenience treat them as in some degree identical, though recognizing them as different. Thus we have the genesis of analogy, the principle which lies at the bottom of all thought, and without which all learning would be worthless, because without it we could not bring what we learn today to bear on the new situations which we have to meet tomorrow. The syllogism, that once supposed instrument of exact thinking and of certainty, is only a formula for reducing analogy to its lowest terms. All inference is transfer, and the transfer may be either of knowledge, as when we infer from the ratio between diameter and circumference of a circle in geometry to the ratio between the diameter and the circumference of the earth; or it may be transfer more strictly of training, as when we use the principles of construction learned in geometry, in building a house. These are cases of transfer between what we think of as closely related fields: but what we think of as related fields depends very much on custom and the state of our knowledge. Custom cannot create relationships, but it can blind us to those that exist. The relation between biology and psychology was scarcely recognized until after the middle of the last century: and every new application of science to practical life is the discovery of a new relationship, obvious enough when recognized, perhaps, but long unthought-of.

All transfer, then, is accomplished through the recognition of similarity in difference: that is, through analogy. All effective transfer is based on recognition of fundamental similarities, and on making correct adaptations to the accompanying differences. This requires patient, careful thinking, and a sound knowledge of the fields or facts which are brought into relationship. There are relationships everywhere: it is our business to find them, and also not to be deceived by superficial analogies. The type of thinking in philosophy, to take an example, is essentially the same as that used in working out a new hypothesis from experimental studies in science: but few philosophers would, in attempting to transfer their training to the field of science, take care to notice also the differences, and adapt themselves to their new data; and we might name scientists who have been equally unintelligent on their part, and made of themselves bad amateur philosophers. Again, "History repeats itself"—that is, Greek and Roman history, or any other, as well as our own, is full of instructive analogies, but they lie deep down; almost invariably, those who go to history for proofs and illustrations, fix on superficial analogies which neither prove nor illustrate. Analogy, then, is the one sole medium of thought and of transfer, but analogy may go wrong: we have yet to speak of the power through whose action analogy is made to go right.

II: The Constructive Imagination. When one turns from action and perception to thought, he retires to a world of his own, of images and concepts—he commits a sort of retreat from reality. The value of this human ability to substitute thinking—manipulation of concepts and images—for manipulation of things, cannot be overestimated; but it brings us to a halt before the paradox which it involves. To think, we must turn away from objective reality: to discover truth, either new or old, by our thinking, we must keep in constant and continuous touch with objective reality. One whose thought retreats from reality and stays in its retreat, may become a dialectician, a clever juggler of words and concepts, but he never will become a fruitful thinker even in a small way. All unquestioning acceptance of authority ,and reasoning from it, no matter how true the authority may be, commits this error; for such reasoning is not based on life, and consequently the reasoner himself cannot properly understand what either he or his authority says. It is always true that any great thinker's avowed followers are his worst enemies.

To correct this tendency of thought to become unreal, is the function of the imagination, which I define as the power of mind that brings thought into rapport with reality. Its one dominant characteristic is unswerving fidelity to essential truth: it leaps straight to the significance of what it contemplates; it catches the spirit of facts and events. Ribot, though his treatment of the imagination differs in many respects from that suggested here, notes clearly the principle underlying this. He says of the imagination: " It reveals a power superior to the conscious individual, strange to him although acting through him: a state which many inventors have expressed in the words, ' I counted for nothing in that,' " (20, p. 52). And again, " the moment of inspiration is ruled by a perfect and spontaneous unity: its impersonality approaches that of the forces of nature," (20, p. 86). Ribot is speaking rather of the moment of inspiration in genius: but the same experience comes to all of us, but on a smaller scale, and often unnoticed, because taken for granted. We turn to this impersonal inspiration for truth, because the unconscious never lies: if it did, we should have what Plato calls " the lie in the soul." If we enlist the unconscious in our thinking, and preserve unperverted our ability to read its deliveries, we have truth in our grasp.

To make good our definition of imagination, we must keep the distinction made by Coleridge between imagination and fancy. Fancy is of two kinds: the first kind is simply imagination at play, and produces in literature such works as the " Arabian Nights "; while in dealing with the outside world it may be credited with the creation of caricatures, fantastic designs and structures made for amusement's sake, and our various games. Unlike imagination proper, it is not serious in what it does: and it never forgets the fact. The other kind of fancy results from an attempt to eke out a small bit of imagination by conscious effort, and make it larger: from it flow the group of faults in literature which Ruskin called " the pathetic fallacy "; and in science and philosophy the fault of which amateur and professional students alike are often guilty, of twisting facts to fit theories. We notice that fancy is not a separate power of mind, but is only either adulterated imagination, or imagination in sportive mood. Only to avoid confusion is it desirable to confine the term imagination to those uses of the faculty which are both serious and sincere.

The imagination is the only power through which new truth, and true analogies, can be discovered. It required a sustained effort of the imagination to give Darwin's data sufficient reality in his mind to suggest the conclusions in the "Origin of Species": it required a no less real, though smaller effort of the imagination to effect a right transfer of knowledge from geometry to house-building, or motor habits from baseball to tennis. Without imagination there may be transfer, but only by accident will it be advantageous. Imagination is the eye of the mind: without it, we proceed blindly. To use another figure, it works with our knowledge like Ezekiel preaching to the dry bones in the desert, when in response to his preaching the bones came together, were clothed with flesh, and became men once more.

The imagination is not subject to the will: we cannot command our moments of inspiration, be they great or small; but we can do so indirectly, by fulfilling certain conditions without which these insights will not come, and then waiting. The first of these conditions is that we saturate ourselves as far as our situation allows, with the kind of knowledge concerning which we are seeking insights; not only because we need the knowledge as material, but because we need the assurance of our own sincerity. The second condition is that we submit to the impersonality which we have already noticed as a trait of imagination. Unless we are willing to follow the truth where it leads, instead of coercing it to lead where we wish to go, the insights which do come will be lost on us. A third condition is a variant of the second: we must not try to strait-jacket our thinking into conventional forms. Forms, though useful, are dead, and moulded on the old. Thought will not always fit the mould, and must be free to take new forms.

To sum up briefly: all learning from experience, all thinking, all inference, is transfer: there are only differences in degree. Knowledge and habits may function as identical elements—transfer in a sort of reflex way—or they may be deliberately transferred, applied, through the discovery by intelligence of analogies, and adaptation to new uses. Analogy is the one and only medium of such transfer: imagination is the power through which true analogies are to be found, and advantageous transfers effected.

Practical

It is commonly supposed that the doctrine of formal discipline has much to do with the selection of school subjects, and little to do with methods of teaching. Certainly many a pedagogical sin has been committed in its name, in the last half-century: many a fruitful reform has been opposed, many a school subject has been maintained in an unfruitful form, lest "disciplinary values" be lost. But if we take Locke's position as representative for the doctrine of formal discipline, these pedagogical sins are to be regarded as perversions grafted onto the doctrine by those who misunderstood it, by those who had a genuine respect and enthusiasm for culture, but were unable to express more correctly its educational basis; and by those, far less numerous, who had "axes to grind," and used the first instrument that came handy. To increase the confusion, other perversions have been mistakenly attributed to the adherents of the doctrine, by their opponents in controversy. If these perversions are taken as representative of the doctrine of formal discipline, then the trend of this paper is away from that doctrine; but if we take the positions of Montaigne, Locke, Herder, as representative, then the theories here advanced are in direct line of descent.

Passing to the practical suggestions that follow from the theories of this paper, they fall into two groups: those having to do with the curriculum, and those having to do with methods of teaching:

I. Principles of teaching. If what we teach is to have any transfer-value—which is almost equivalent to saying, if it is to have any practical value—for the average student, the transfer should be half-made in school. To make the transfer complete is to defeat the purpose of the school, which is to present experience in concentrated form, ready to be expanded and applied in later life: not to make any transfer at all in the school, results in blinding the pupils to the possibility of transfer—in closing their minds to the idea that theories and knowledge learned in school have any bearing on every-day life. The school-subjects, then, should, as Dewey urged, be related to life. Pupils in school must learn many things which cannot be based on their present experience, but a basis in their present experience should be sought wherever possible. A student who has analyzed a bit of his own thinking, will begin to see what logic is all about: one who has studied the growth of plants in his garden, or in the woods, is ready to understand botany. We cannot, as Plato imagined, dispense with the stars and yet study astronomy. This relating of subjects to life is not to be secured merely by getting out text-books whose problems and discussions rest on the life of the immediate neighborhood. These will help, but a child can quite easily fail to recognize his own father's farm when he finds it in a text-book, as many of our teachers handle a text-book. The farm-wagon will look like Hector's chariot, after it has gone through the mill of the five formal steps. If the teacher is to relate to life the knowledge which he imparts to his pupils, it must be related to life in his own mind. A teacher of Shakespeare who is himself ignorant of and uninterested in human nature, may produce a few philologists or rhetoricians, but he will never make literature a force in the thought and life of his pupils, which is certainly the sole purpose of teaching literature in the high school. A teacher of physics who would make his pupils more intelligent and efficient in every-day affairs, must himself be awake to the countless illustrations and applications to be encountered everywhere, of the knowledge which he has to teach. We can only teach what we know: if we would teach anyone the uses of the knowledge which we have to impart, we must understand those uses, ourselves.

Since the two great media of transfer are intelligence and imagination, formalism in education is fatal to transfer. Formalism deadens both intelligence and imagination. Instead of encouraging the mind to use all the resources at its command in dealing with material both new and old, it insists that thought shall follow only certain prescribed channels, in a certain prescribed way. This ignores the fact that the best thinking is based on the richest variety of spontaneous suggestions, and the best mind is most fertile in ideas. Thought must have forms, to keep it from straying aimlessly, but these forms exist only for the sake of thought, and it should be free to remake them as it goes along. To condemn a student's work as "wrong" because it is not cast in what the teacher considers the orthodox forms, is utterly unpedagogical. Formlessness is to be condemned, but so long as the student's work is systematic, the forms which he uses may be judged as well or ill-aadpted to his work, and criticized accordingly, but they cannot properly be called simply "right" or "wrong." Where a superintendent commands his principals and supervisors, the principals and supervisors command the teachers, and the teachers obediently command the pupils, that every piece of work must be done in just one minutely prescribed way and no other: there we have the last word in unreality. It makes a fine machine for exhibition purposes, enables the superintendent to make a beautifully systematized report, and satisfies a certain ideal of mechanical efficiency—but what of the children? Accustomed only to strict obedience, not permitted to follow out their own intellectual tendencies, carefully guarded against the chance to meet intellectual difficulties at first hand—lest they meet them in a way which the teacher disapproves—they are less able to think independently than if they had never been to school; and one who does not think independently, does not think at all. And no thinking, no transfer. The arithmetic learned in school will not be used more than absolute necessity compels; the history will have no influence whatever on the child as a future citizen; the hygiene course will not lead him to care more intelligently for sanitary conditions at home.

The effect of formalism on the imagination is even more serious. Imagination is the most elusive function of consciousness, and only perfect sincerity can induce it to speak, or enable us to hear correctly when it does speak. Formalism attempts to force into artificial and arbitrary channels the one function whose very nature is spontaneity—and imagination will not be coerced. It is well known that children who have been taught to draw, with rule and compass, as it were, in the Kindergarten, show much less artistic merit in their drawings than children of the same age who have not had such training. Any teacher who has tried to make English, or Latin, or geometry, or even botany, live in his pupils' minds, must have been oppressed by the utter inability of their imaginations after eight or nine years of schooling, to seize the meaning of a fact presented in the school-room. The imagination can be touched even then; many a live teacher succeeds in touching it, by making forms only ancillary, and by keeping fresh his own realization of the meaning of what he is teaching: but when a mind has been *eingestellt* against any hint of imagination in school work for years, it is no easy matter to break through the *Einstellung,* and the slightest provocation will restore it to dominance.

Vitality is not the only need in school work: it should also be difficult. This fact demands emphasis because it is a popular fallacy that work to be "interesting" must be sugar-coated, made easy, that the disagreeable must be tabooed: and perhaps some readers might imply that this plea for imagination in teaching involves the same thing. Not at all. One who has in his school career never done anything disagreeable, who has never had to study until he has gained his "second breath," has missed one of the most valuable results of an education. All the studies of the learning process, as well as universal experience, prove that it is hard and intense work that educates. But there are abundant difficulties in the nature of any subject, without arbitrarily imposing others; and these natural difficulties have the merit of stimulating thought and stirring imagination, while difficulties which the student feels to be arbitrarily imposed, are deadening, and tend to make most of the class feel that thinking is not an important part of education, while they repel the sturdier minds, and compel at best but a sullen acquiescence. Difficulties which are attacked unwillingly, under compulsion, only make the student more dependent on his taskmaster: he tends to lose all ability to set himself tasks and carry them out on his own initiative. But adolescents—as, indeed, most human beings—enjoy facing difficulties that are felt to be worth while, and mastering them. In such difficulties alone is disciplinary value to be found. For this reason, I might pause to add, studies should be prescribed only as a last resort. One works better at a study which he has chosen of his own free will. We must, apparently, in the present state of secondary education, have a large amount of prescription, but it should be recognized for what it is—a necessary evil—and mitigated in every way possible.

II. The Curriculum. Since transfer is possible, and, given sensible teaching, is assured: therefore we may lay it down as a first principle in deciding on educational values, that those subjects whose content is of the widest applicability, are the first to be chosen, where general education is the aim. Also, even in strictly vocational training, the wider applicability of the principles underlying the rules of the trade, should be brought to notice wherever possible. This gives a better control over the rules of the trade itself, has a great cultural value as a stimulus to thought, and most important of all, perhaps, gives the one so educated greater adaptability. In the rapidly changing industrial conditions of the time, no one can foresee with certainty the future of any trade. New inventions, new methods, may make one's training an unsalable article when he has barely finished his apprenticeship; and the more highly specialized his skill, the less adaptable will he be to new conditions, unless he has also kept open avenues of transfer of training, through basing his knowledge and training on general principles, and avoiding the formation of a too rigid set.

It follows from this that pure science is preferable to applied science. Really, pure science should in its teaching methods approximate to applied science, since, as said before, the transfer from theory to practice should be half-made in school. But the point of view should be that of pure science, which concerns itself about general principles, and the relations between them: not that of applied science, which only lays down rules for the performance of certain acts, and cares not at all why those rules hold good. An empirical formula is a block of offense to pure mathematics; to applied mathematics, one formula is as good as another, if it works. In teaching pure science, the pupil will best understand these general principles if he has arrived at some of them by his own observation: therefore the first approach to a science should be inductive, free from any special apparatus, and innocent of technical terminology. The average boy would stand in awe of a dollar watch if he saw it labelled a chronometer, in a laboratory. The first two or three weeks of a physics course, for example, should be done without either text-books or laboratory; the students should simply be set to studying intently the behavior of familiar things, until they had firmly grasped a few fundamental principles. It would be even better to give this preliminary work, or some of it, at least, in the last week or two of the year preceding the physics course itself, so as to give the pupils something to think about during the summer. In this way the long vacation, which is now very much a period of forgetting, would become a period of learning—of learning of the best kind. Given this informal introduction to the science, then the technical names for the principles that have been observed, can safely be given, and the work with text-book and laboratory begun. To do all the work inductively would gain nothing, and would slow up the course intolerably; but a week of inductive study at the beginning will give a basis of understanding from which the pupils will be able spontaneously to apply their knowledge in understanding and dealing with all sorts of everyday problems, as fast as the knowledge is acquired. They have started out with a "transfer-*Einstellung,*" so to speak, and will work over their knowledge as they go along: without this *Einstellung,* their knowledge remains isolated, and every bit of it that is to be used must be worked over anew, later. Further, this isolation develops a feeling of unreality which is one of the hardest of all mental sets to break up.

A second determining principle in planning a curriculum, is that the student's course of study should contain several different kinds of subjects. The mind will form sets, especially in adolescence, whether we wish it or not; the school should see to it that a sufficient number and variety of sets should be formed, so that the student is reasonably well-equipped on other sides of his nature, as well as on the side that his future vocation will develop. This is needed not only for his own personal good, but also because every man is a citizen and a member of society, as well as a workman. He is a layman with respect to every vocation but one, and on the intelligent interest of the layman depends practically all progress in every line. Without the pressure of that intelligent interest upon them, professionals in any line become stereotyped, averse to change, and resist improvements that the thoughtful members of their body suggest.

A third principle is that every one's course of study should be so chosen that the different subjects will supplement each other in the kind of work provided. The student should be allowed and induced to do his own choosing, so far as practicable, but in any case, the choice should heed this principle. Every subject has its characteristic effect on the mind, both for good and bad. The effect of geometry as put in the passage from Pascal quoted above, will serve as an example. The course of study should be planned to make these characteristic effects balance each other. Moreover, every subject makes some demand on powers which, because that demand in the given subject is slight and scattered, it fails to develop adequately. Thus, to take an example from advanced study, biology demands, to evaluate its data, precisely the kind of thinking which is the characteristic feature of philosophical study, and it has also to deal at times with conceptions which are central in philosophy. But in the study of biology, this kind of thinking and these conceptions play so small a part, quantitatively speaking, that the biologist acquires little familiarity with them, in his study, and often betrays a surprising incapacity when he has to deal with them; and with it sometimes an equally surprising blindness to his own incapacity. An intelligent study of philosophy—which must also be a sympathetic, interested study of it—would at the same time soften the arrogance and correct the incapacity. The same thing applies, *mutatis mutandis,* to every study. Every specialist, from philosopher to classicist, is likely to be arrogant in his claims, and to be handicapped in his own line through lack of some kind of knowledge and training which is needed, but not adequately provided, in specialized study.

Finally, the school should aim to teach a few things well and thoroughly to each student, not to give a scattering knowledge of a great variety of subjects. Not content, but assimilable content, is what counts in education, and before knowledge can be assimilated, there must be present in the mind a coherent body of related knowledge. A well and broadly-educated adult can assimilate almost any bit of knowledge in almost any form, with some success; but an adolescent, whose education is only beginning, must have enough of a given study presented to develop it into coherence. If insufficient time is given to the study, nothing is likely to be gained from it but a chaos of mere memorized facts, useless, because unassimilated. Given a nucleus of three or four principal studies, little excursions into other lines are valuable as means of starting centers of apperception, some of which, at least, may be followed up independently later; and as a means of helping the pupils to see how wide and rich the life of the world is. But the work should not all be little excursions, and the excursions themselves should be given by methods less formal than the studies which are especially stressed: set study should fall into the background, there should even be no final grades, no academic ranking, on such work. While such work may have immense potential value, it has no present academic value of the kind which credits should represent, and we only deceive ourselves by pretending that it has. Besides, "working for marks" always diminishes spontaneity, and makes teacher and pupil in a sense natural antagonists: we should welcome the opportunity to abolish marks wherever possible. Thus academic ethics and pedagogic efficiency demand the same thing.

But returning to the point that the students' course should consist mainly in intensive and thorough study of a few subjects: another reason for this is that the preliminary stages of any study are almost purely memory-work, and to get any disciplinary value, or any cultural value, the work must be carried beyond that stage, to the point of a certain degree of mastery. Anyone would recognize that one who has learned to play the piano well is better trained musically than one who has spread his time over the study of twenty or thirty instruments, can play the scale on all, but can do nothing else on any. The latter has spent all his time on elementary details of technique: the former has been able to live and study on planes of musical significance of which the other has no knowledge. We recognize this in music, but in school-study it is overlooked. Even on the well-established principle of the hierarchy of habits, the second year of a subject should have more cultural value than the first; the third than the second. It should be recognized, and never forgotten, that higher mental habits are more generic, are more readily transferable, than lower; and that the fact of having worked through all or nearly all the stages of the learning process in any one subject, furnishes a basis of guidance in attacking any subject, which basis is often sufficient to cut years off the time required for a new subject.

BIBLIOGRAPHY

1. ADAMSON, J. W. John Locke's educational writings. London, Arnold, 1912. 265p.
2. BAGLEY, W. C. Educational values. N. Y., Macmillan, 1911. 267p.
3. COMENIUS, J. A. The Great Didactic. London, Black, 1891. 468p.
4. COOVER, J. E. & ANGELL, F. General practice effect of special exercise. Am. Jour. of Psychol., 1907, Vol. 18, pp. 328-340.
5. DAVIDSON, T. Rousseau and education according to nature. N. Y., Scribner, 1895. 268p.
6. DE GARMO, C. Herbart and the Herbartians. N. Y., Scribner, 1895. 268p.
7. DEWEY, JOHN. How we think. Boston, Heath, 1910. 224p.
8. —— ——. School and society. Chicago, Univ. Press, 1899. 125p.
9. FRACKER, G. C. On the transference of training in memory. Psychol. Rev. Mon., 1908, Vol. 9, No. 38. Univ. of Iowa Studies in Psychol., No. 5, pp. 89-93.
10. GRAVES, F. P. History of education during the middle ages and the transition to modern times. N. Y., Macmillan, 1912. 328p.
11. HART, B. and SPEARMAN, C. General ability, its existence and nature. Brit. Jour. of Psychol., 1912, Vol. 5, pp. 51-84.
12. HECK, W. A. Mental discipline and educational values. N. Y. Lane, 1911. 208p.
13. HENDERSON, E. N. Textbook in the principles of education. N. Y., Macmillan, 1910. 578p.
14. —— ——. Formal discipline. Monroe's Cyclopedia of Education. N. Y., Macmillan, 1911, Vol. 2, pp. 642-3.
15. JUDD, C. H. Special training and general intelligence. Ed. Rev., 1908, Vol. 36, pp. 28-42.
16. MONROE, P. History of education. N. Y., Macmillan, 1905. 772p.
17. —— ——. Sourcebook of the history of education for the Greek and Roman period. N. Y., Macmillan, 1901. 505p.
18. MONTAIGNE, M. E. Education of children. N. Y., Appleton, 1899. 152p.
19. MEUMANN, E. The psychology of learning. Trans. by J. W. Baird. N. Y., Appletons, 1913. 393p.
20. RIBOT, T. Essay on the creative imagination. Chicago, Open Court Pub. Co., 1906. 370p.
21. ROYCE, J. Outlines of psychology. N. Y., Macmillan, 1903. 392p.
22. RUEDIGER, ——. Principles of education. Boston, Houghton Mifflin, 1910. 305p.
23. RUGER, H. A. The psychology of efficiency. Archives of Psychology, 1910, No. 15. 88p.
24. SLEIGHT, W. G. Memory and formal training. Brit. Jour. of Psychol., 1911, Vol. 4, pp. 386-457.
25. SPEARMAN, C. Qualified and unqualified "formal training." Jour. of Exp. Pedagogy, 1914, Vol. 3, pp. 247-54.
26. THORNDIKE, E. L. Educational psychology. N. Y., Teachers College, 1914, Vol. 2.

27. ——— ——— and WOODWORTH, R. S. The influence of improvement in one mental function upon the efficiency of other functions. Psychological Rev., 1901, Vol. 8, pp. 247-261; 384-395; 553-564.
28. WOODWARD, W. H. Vittorino da Feltre. Cambridge, Univ. Press, 1897. 250p.
29. ——— ———. Studies in education during the age of the Renaissance. Cambridge, Univ. Press, 1906. 336p.
30. ZIEGLER, T. Geschichte der Pädagogik. Munich, Beck, 1909. 410p.

HEIGHT AND WEIGHT OF CHILDREN IN RELATION TO GENERAL INTELLIGENCE

By Cyrus D. Mead
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Sometime principal of the Indiana School for Feeble-Minded Youth

Mental dullness or brightness and general body growth have in the past been associated in various studies by investigators. That on the whole, in groups of children, there seems to be some correlation, is evident. In a study on St. Louis children Porter (9) concluded that bright children are taller than dull children, and that "precocious children are heavier and dull children lighter than the mean child of the same age." Smedley (11) and MacDonald (6) have in substance made similar conclusions.[1]

Problem and Data

If such relation were evident among normal children, would the differing degrees of mentality as exist in children mentally defective be reflected, on the average, in the height and weight of these children? Would we find also a greater variability among such children? With such questions in mind two hundred eighty-eight boys and one hundred forty-one girls of the Indiana School for Feeble-Minded Youth were examined in February and March 1910. Among other tests physical and mental, the strength of grip and dextrality were also taken. This will furnish the data for a study now in preparation.

In order to have norms with which to compare normal children and the mentally defective, two hundred thirty-six boys and two hundred forty-five girls of the Caldwell, New Jersey, public schools were measured in May, 1912,[2] as to the same traits by the same examiner and as nearly as possible under the same conditions. The height was recorded with shoes in both groups; the weight, with ordinary clothing. All measurements and all calculations have been made by the author himself. The factor of variability has been reduced to the minimum. The ages are given in years and months. In reckoning the age from birth, from one to fifteen days inclusive were dropped, and from sixteen to thirty were added to the month.

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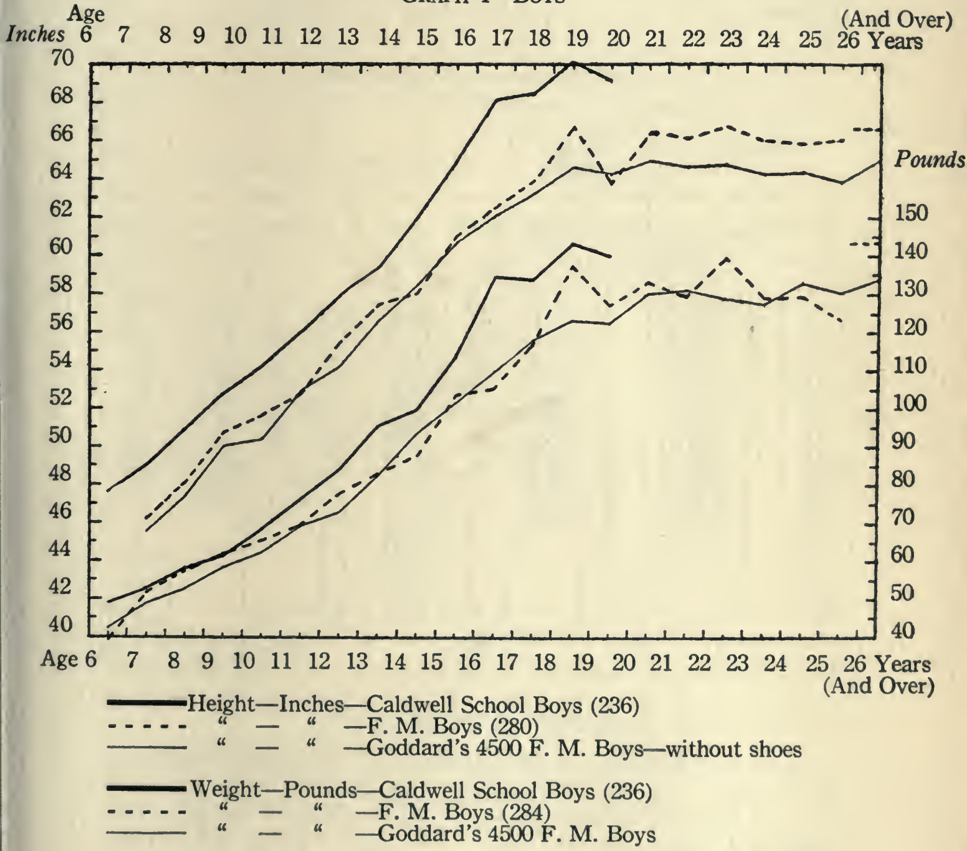
[1] For a condensed summary of several investigations, see Whipple (14) pp. 47-60. West (13) reaches an opposite conclusion. His classification of children was on the teacher's judgment, while Porter's was the school grade in comparison with age.

[2] For the use of the schools, the author is indebted to Superintendent D. C. Barnett and the Board of Education.



Graph I—Boys

The defective children were classed from the experience and association of the teacher, attendant, and principal, into A, B, C, D, E grades. These would group approximately into the common institution classes of morons (A-B); imbeciles (C); idiots (D-E).[3] On account of the few cases, the tables and charts which follow show two grades of intelligence, the morons in one group, and the imbeciles and idiots in the other, in comparison to the normal group. The group of total defectives also is given. The individual measurements of each child are grouped according to sex, age,[4] grade, and number of cases, with averages and deviations,[5] in Tables 1-4. The curves representing these data show in Graphs 1-5.

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[3] The moron has a mentality comparable to that of the normal child of from eight to twelve years; the imbecile, three to seven years; the idiot, two years or under. See Goddard (5) p. 221.

TABLE I

BOYS' HEIGHT—INCHES. (WITH SHOES)

	Grades A and B Moron		Grades C, D and E Imbecile and Idiot		Total Defectives			Normal		
Age	Cases	Average	Cases	Average	Cases	Average	A. D.	Cases	Average	A. D.
6			1	40.80	1	40.80		8	47.57	1.9
7	5	45.76	3	46.83	8	46.16	2.4	14	49.01	1.5
8	10	48.49	4	47.12	14	48.10	1.4	32	50.94	1.9
9	10	51.61	4	48.65	14	50.76	2.1	29	52.67	2.3
10	11	52.46	7	50.47	18	51.68	1.6	18	54.16	2.2
11	13	53.89	9	51.20	22	52.79	2.4	19	55.99	2.4
12	10	56.51	8	54.36	18	55.55	3.1	24	57.92	2.2
13	11	58.18	6	56.28	17	57.51	3.4	14	59.37	2.8
14	14	60.04	11	55.43	25	58.01	4.2	25	62.06	3.0
15	15	63.01	8	57.50	23	61.09	4.5	26	64.99	3.0
16	8	65.75	9	59.52	17	62.45	3.8	17	68.17	1.7
17	4	65.77	6	62.68	10	63.92	4.2	6	68.53	2.0
18	5	67.00	2	66.20	7	66.77	1.7	3	70.20	1.1
19	3	67.07	6	62.05	9	63.72	3.6	1	69.30	
20	3	67.97	6	65.83	9	66.54	1.5			
21	1		7		8	66.21	1.4			
22	0		5		5	66.80	2.6			
23	4		10		14	66.04	1.8			
24	0		2		2	65.85	3.5			
25	1		4		5	66.12	2.0			
26-48	9		25		34	66.69	2.2			
	137		143		280			236		

INTERPRETATION OF GRAPHS

In all the graphs the age appears at the bottom and also at the top. On the average, the age will fall near the half year. The scale of inches is marked on the left margin; the scale of pounds, on the right. The upper group of curves represent height; the lower group, weight. The accomplishment in either trait is read from the same age point.

It should be noted that in the group of Caldwell school children a relatively high grade of children has probably been chosen. It is a little city of some five or six thousand, about an hour from New York City, and is a most healthful place with the advantages of country life.

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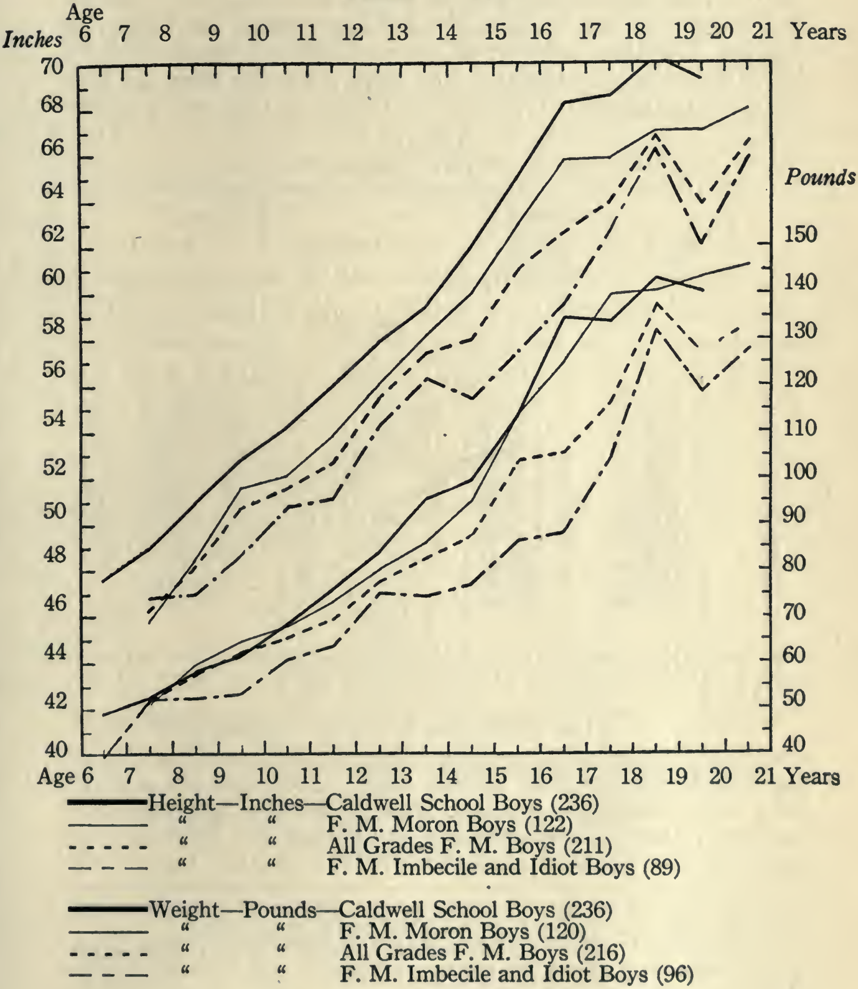
[4] Six years of age means from six to seven.

[5] In calculating the average deviation, decimals from one to six tenths were dropped, and those above added.

From Graph I we see the Caldwell boys higher at each age by from two to five inches than feeble-minded boys, the

GRAPH II—BOYS



difference increasing somewhat gradually with age. All cases of feeble-minded over twenty-six years were grouped and the average height and weight both appear at the right margin, the average height of adult feeble-minded over twenty-six years being about 66.7 inches. The light continuous line of the upper group shows the average height of about 4,500 feeble-minded boys, six to twenty-six years of age, without shoes, as compiled by Goddard (5)[6] in 1912. Allowing an inch for shoes, the general similarity of the two curves is evident.

The curves for weight are not as smooth as might be wished, a greater number of cases would of course tend to make them more regular. For ages seven to nine the two curves approximate, feeble-minded boys at nine years showing a little heavier than normal boys. After age ten normal boys are consistently heavier than defectives by from five to fifteen pounds, the difference increasing in a general way with age.[7] The adult weight for thirty-four boys over

TABLE II

BOYS' WEIGHT—POUNDS. (ORDINARY CLOTHING)

	Grades A and B Moron		Grades C, D and E Imbecile and Idiot		Total Defectives			Normal		
Age	Cases	Average	Cases	Average	Cases	Average	A. D.	Cases	Average	A. D.
6			1	39.00	1	39.00		8	49.12	6.5
7	5	51.80	3	52.33	8	52.00	6.0	14	52.82	4.6
8	10	59.60	3	52.33	13	57.92	4.0	32	58.04	5.2
9	10	64.90	4	53.75	14	61.71	7.3	29	61.39	8.0
10	11	68.27	10	60.70	21	64.66	5.8	18	68.51	8.7
11	13	73.30	9	63.88	22	69.45	7.4	19	76.31	12.2
12	10	80.30	9	75.11	19	77.84	12.0	24	84.03	12.7
13	11	86.00	5	74.80	16	82.50	12.1	14	95.53	18.2
14	14	95.21	12	77.16	26	86.88	19.6	25	99.57	14.8
15	14	113.85	8	86.25	22	103.82	19.9	26	113.63	16.7
16	8	125.25	10	88.20	18	104.66	22.1	17	134.52	12.4
17	4	139.75	7	104.14	11	117.09	26.3	6	133.83	11.5
18	4	140.25	2	132.00	6	137.50	8.8	3	143.16	10.5
19	3	143.66	6	118.66	9	127.00	29.8	1	140.00	
20	3	146.00	7	127.86	10	133.30	17.3			
21	1		7		8	129.50	7.2			
22	0		5		5	139.40	18.4			
23	4		10		14	129.07	13.6			
24	0		2		2	129.50	13.5			
25	1		4		5	123.80	19.8			
26-48	9		25		34	143.80	18.4			
	135		149		284			236		

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[6] This work is by far the greatest ever done and sets norms for years to come for the feeble-minded in height and weight.

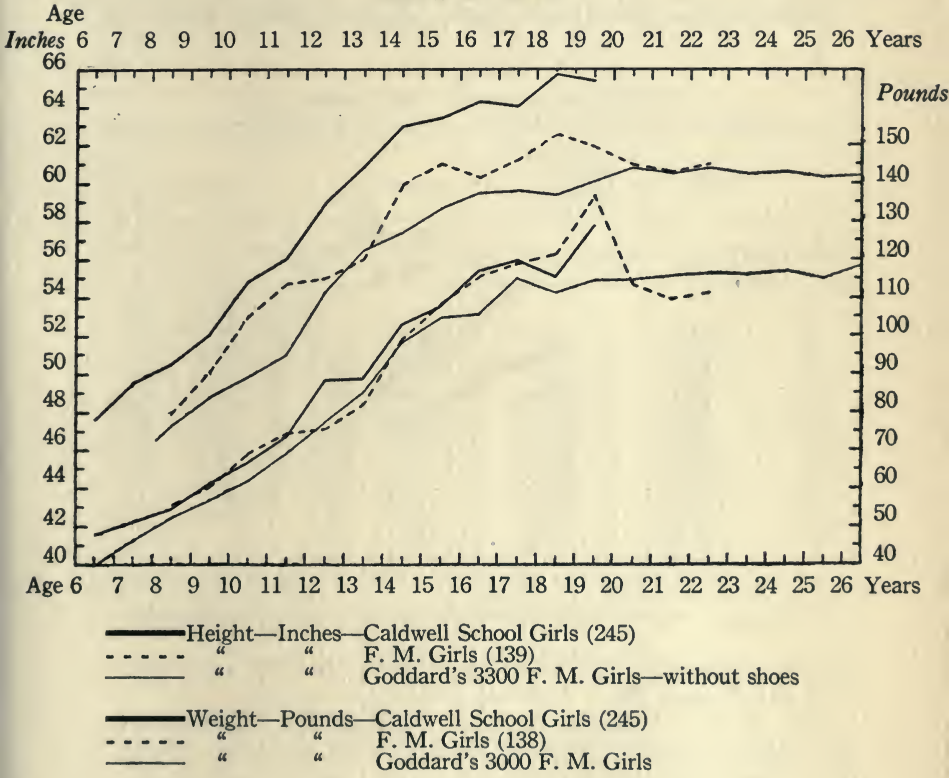
[7] Tarbell (12) says: "Feeble-minded children (boys and girls) are about two inches shorter and nine pounds lighter than normal children of the same age."

Goddard (5) p. 229 says: "If, however, we take the line representing defectives of all grades, we find that while 'he is not two inches shorter and nine pounds lighter' he nevertheless is one inch shorter and two pounds lighter up to the age of fifteen. After that he is three inches shorter and twelve pounds lighter."

twenty-six shows 143.8 pounds. The sedentary institution life and more regular dieting and sleep tend toward weight, especially in the more imbecile cases. The same might be said of all grades in the earlier years. Goddard's curve for weight for about 4,500 feeble-minded boys, six to twenty-six years of age, is shown in the light continuous line below.

Graph II shows again the curves of height and weight for normal and defective boys as separate groups and in addition, the defectives divided into two groups, the higher grade moron, and the lower grade imbecile and idiot. The heavy line in either group is the normal; the light line, the higher grade defectives; the broken dash line, all defective boys of this study; the broken dot and dash line represents the lower grade imbecile and idiot as a group. This graph shows the imbecile and idiot boy lower in stature and less

GRAPH III—GIRLS



in weight than the group of feeble-minded boys in general, excepting age seven. It shows the higher grade moron taller and heavier at each age, excepting seven, than the defective group whole. In weight the moron group more nearly approximates and at places exceeds the normal. At no age in height, and at no age in weight excepting 8, 9, 17, and 19 years, does the high grade mentally defective boy reach or exceed the average normal boy of six to nineteen years in these traits.[8] These exceptions may very probably be due to the few or exceptional cases, and the author wishes it clearly understood that conclusions other than the most general based upon these data are not wise.

TABLE III

GIRLS' HEIGHT—INCHES. (WITH SHOES)

Age	Grades A and B Moron		Grades C, D and E Imbecile and Idiot		Total Defectives			Normal		
	Cases	Average	Cases	Average	Cases	Average	A. D.	Cases	Average	A. D.
6								9	47.60	1.4
7								17	49.53	2.3
8	1	49.00	4	47.55	5	47.84	3.4	17	50.49	2.8
9	3	50.80	5	49.70	8	50.11	2.4	27	52.00	2.1
10	2	50.60	6	54.00	8	53.15	2.0	22	54.84	2.1
11	6	54.45	1	56.50	7	54.74	1.3	23	56.05	3.0
12	7	54.78	5	55.24	12	54.97	2.8	19	59.03	2.1
13	2	53.00	7	56.84	9	55.99	3.0	27	60.84	1.9
14	13	60.28	4	58.52	17	59.87	2.3	20	63.02	3.0
15	7	61.15	2	60.75	9	61.06	3.7	28	63.43	2.1
16	11	61.06	3	57.36	14	60.33	2.5	20	64.34	2.0
17	12	61.58	2	59.00	14	61.21	2.0	10	64.05	1.8
18	6	62.91	5	62.18	11	62.58	2.2	4	65.70	.5
19	5	61.94	1	62.10	6	61.96	1.8	2	65.40	3.1
20	10	62.52	3	56.17	13	61.05	3.0			
21	3	60.30	1	61.60	4	60.62	3.0			
22	2	60.95	0		2	60.95	2.3			
	90		49		139			245		

The record of girls is pictured in Graph III. The curves for height are more irregular than those of the boys. From this study mentally defective girls as a group are on the average from two to five inches shorter than normal school girls. This is about the same as with boys. It will be noted that there is a larger difference between the defective girls of this study and Goddard's 3,300 institution girls in regard to height than difference between boys (Graph I). In this study the two groups of higher and lower grades are about the same in number with boys, but with girls there are nearly twice the number of the higher grade.

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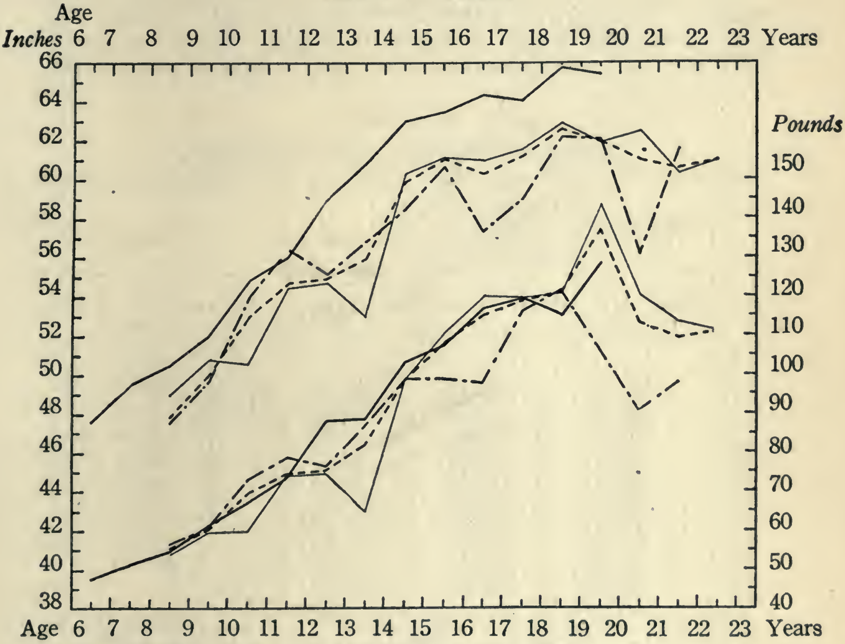
[8] A greater number of cases would probably "smooth out" the exceptions at the two latter ages.

In weight it is very noticeable that the girls of the two large groups, normal and defective, up to nineteen years deviate less than do the boys. Weight would no doubt be subject to modification by regular habits of eating and sleeping much more than the individual's natural tendency to stature. These girls of institution care show the good effects of such regularity when it comes to bodily weight.

GRAPH IV—GIRLS



━━━━ Height—Inches—Caldwell School Girls (245)
———— " " F. M. Moron Girls (90)
- - - - - " " All Grades F. M. Girls (139)
— — — " " F. M. Imbecile and Idiot Girls (49)

━━━━ Weight—Pounds—Caldwell School Girls (245)
———— " " F. M. Moron Girls (90)
- - - - - " " All Grades F. M. Girls (138)
— — — " " F. M. Imbecile and Idiot Girls (48)

Graph IV shows the defective girls divided into the higher and lower grades of mental defect. These curves are very unsatisfactory, showing much irregularity. This condition may be due to one or several causes. First, the classing of the defective children into grades is chiefly empirical, an inter-changing of one or two cases might modify the lines; second, it is to be regretted that the number of girls tested is much smaller than that of boys; third, there may be exceptional cases as number 123 at age 20 (Table II). The most peculiar feature of the lines as they are is the crossing at age fourteen. From Graph II, high and low grade defective boys are distinctly apart at each age in height and weight. But with girls the curves cross at 14. Before this time (excepting 8 and 9 years in height) the lower grade girls are taller and heavier than the brighter girls; after age 14, the reverse is true. Can it be that high and low grade defective girls at about the fourteenth year reverse themselves in body growth? Again let it be understood that the condition is probably due to too few or exceptional cases.

TABLE IV

GIRLS' WEIGHT—POUNDS. (ORDINARY CLOTHING)

Age	Grades A and B Moron		Grades C, D and E Imbecile and Idiot		Total Defectives			Normal		
	Cases	Average	Cases	Average	Cases	Average	A. D.	Cases	Average	A. D.
6								9	47.94	5.5
7								17	51.29	6.1
8	1	52.00	4	56.75	5	55.80	9.0	17	54.38	6.5
9	3	59.66	5	61.00	8	60.50	7.2	27	61.48	6.9
10	2	60.00	5	73.20	7	69.43	6.7	22	67.14	7.4
11	6	74.00	1	79.00	7	74.71	10.8	23	73.88	13.2
12	7	74.71	6	76.83	13	75.69	8.9	19	88.41	12.7
13	2	65.00	6	87.66	8	82.00	13.7	27	88.44	9.4
14	13	99.00	4	99.00	17	99.00	13.0	20	103.13	12.3
15	7	110.71	2	99.00	9	108.11	17.0	28	107.87	11.2
16	11	120.09	3	98.00	14	115.35	17.6	20	117.00	11.5
17	12	119.50	2	116.50	14	119.07	12.6	10	119.67	10.8
18	6	121.18	5	121.80	11	121.45	12.8	4	115.27	8.8
19	5	143.20	1	106.00	6	137.00	24.0	2	128.65	8.2
20	10	120.00	3	90.66	13	113.23	18.5			
21	3	113.66	1	98.00	4	109.75	11.2			
22	2	111.00	0		2	111.00	3.0			
	90		48		138			245		

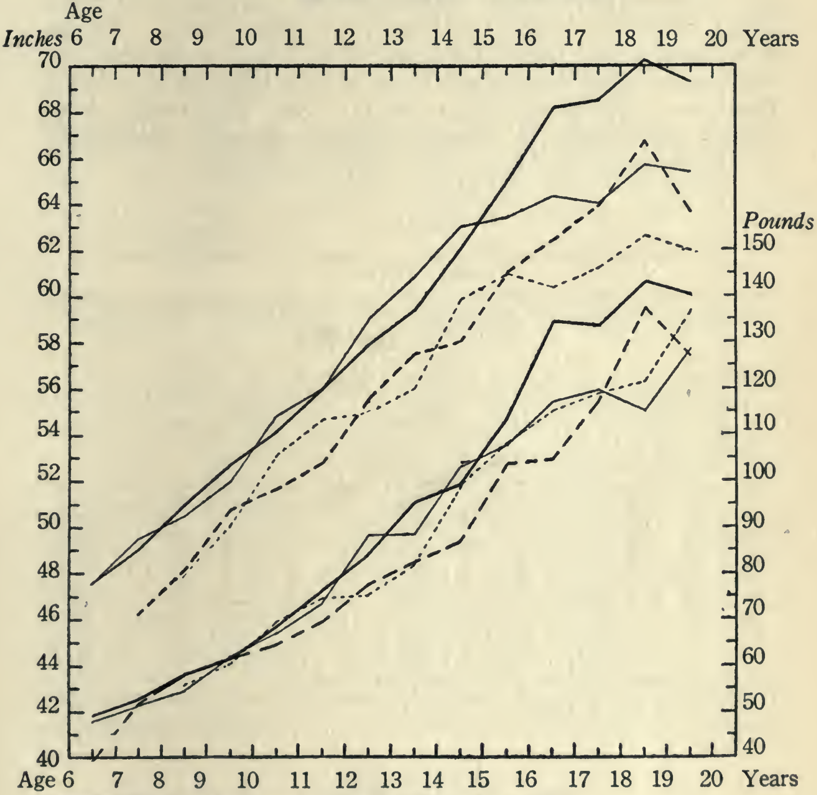
SEX DIFFERENCES

Various studies with large groups of normal children have shown that from about eleven to fifteen years of age the girls were larger than boys in both height and weight. (For example, Smedley (11, p. 1100); or MacDonald (6, p. 1023.)

In order to see whether or not this condition reflected itself in measurements of mentally defective children, Graph

V was made to show the records of both groups in both traits superimposed. The heavy and light continuous lines in the upper group represent the height of the Caldwell school boys and girls respectively. The broken dash and broken dot lines represent the height of feeble-minded boys and girls. The same comparisons are true in the lower group of lines as to weight. Excepting ages twelve and thirteen with

GRAPH V—COMPARISON OF SEXES—NORMAL AND FEEBLE-MINDED—HEIGHT AND WEIGHT



━━━Height—Inches—Caldwell School Boys (236)
——— “ “ Caldwell School Girls (245)
- - - - - “ “ F. M. Boys (211)
– – – – – “ “ F. M. Girls (139)

━━━Weight—Pounds—Caldwell School Boys (236)
——— “ “ Caldwell School Girls (245)
- - - - - “ “ F. M. Boys (216)
– – – – – “ “ F. M. Girls (138)

defectives, in which there is an abnormal rise with boys and drop with girls, normal and feeble-minded girls are taller than normal and feeble-minded boys from ages ten to fifteen. In weight there is the same general condition. Excepting age thirteen with normals at which both curves are irregular, the Caldwell girls weigh more than the Caldwell boys from about beginning twelve to beginning fifteen years. Noting exceptions at the twelfth and thirteenth years in the lines for defectives, feeble-minded girls are heavier than feeble-minded boys from ten to seventeen years. Sex differences as to height and weight in normal children through adolescence is approximately the same with mental defectives.

TABLE V

PER CENT OF DEFECTIVES REACHING OR EXCEEDING AVERAGE CALDWELL NORMAL CHILDREN

Age	Boys' Height			Boys' Weight			Girls' Height			Girls' Weight		
	Cases	No.	Per cent	Cases	No.	Per cent	Cases	No.	Per cent	Cases	No.	Per cent
6	1	0	0.0	1	0	0.0						
7	8	1	12.5	8	5	62.5						
8	14	1	7.1	13	5	38.5	5	2	40	5	2	40
9	14	5	35.7	14	7	50.0	8	3	37.5	8	4	50
10	18	2	11.1	21	6	28.6	8	3	37.5	7	3	42.9
11	22	3	13.6	22	4	18.2	7	2	28.6	7	4	57.1
12	18	5	27.8	19	7	36.8	12	1	8.3	13	3	23.1
13	17	7	41.2	16	3	18.7	9	1	11.1	8	3	37.5
14	25	6	24	26	7	26.9	17	3	17.6	17	6	35.3
15	23	7	30.4	22	6	27.3	9	3	33.3	9	4	44.4
16	17	3	17.6	18	2	11.1	14	2	14.3	14	4	28.6
17	10	1	10.0	11	5	45.4	14	3	21.4	14	5	35.7
18	7	0	0.0	6	1	16.6	11	2	18.2	11	7	63.6
19	9	1	11.1	9	3	33.3	6	0	0.0	6	4	66.6
Total	203	42	20.7	206	61	29.6	120	25	20.8	119	49	41.2

VARIABILITY

As far as is known to the author only one other study has calculated the age variability in height and weight of mentally defective children. Wylie (16) in a study of about four hundred children of each sex, from one to thirty years of age, found the mean variation to be greater with defectives than with normals.[9] Referring to Tables I to IV, one can compare the variability at age of the two classes of children in this study. Excepting ages 8, 9, and 10, defective boys are more variable than normal boys in height. In weight, up to about age thirteen, defective boys are more constant; after thirteen they are more variable than normal boys.

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[9] He says, p. 6: "For height the curve of mean variation exceeds that of normal children except in two or three instances. In general the mean variation is greatest at times of fastest growth, but there are many marked exceptions to the rule. . . . The curve of mean variation for weight shows the same general features as that of height except that it is nearer normal up to ten years."

From eight to nineteen inclusive, defective girls vary more than normal girls in height if we except ages 10, 11, 14, and 19. In weight, after the thirteenth year, defective girls vary more than normal girls at age. Very probably a greater number of cases, if distributed over the grades of defect, would show defective children more variable in height and weight than normal children, excepting possibly weight in the earlier years, if defective children had the regular care of institution life.

Per Cent of Defectives Reaching or Exceeding Average Caldwell Normal.

This is shown in Table V for each age. To interpret, take age seven for example: Of eight mentally defective boys, one or 12.5 per cent reached or exceeded the average height of Caldwell boys at the same age. Or taking the total: of 203 mentally defective boys from six to nineteen years of age inclusive, forty-two or 20.7 per cent reached or exceeded in height the average Caldwell boy at age. This is significant and means approximately that only one defective boy or girl in five reaches the average height for his age of a normal boy or girl. In weight boys make nearly a thirty per cent showing, while girls almost reach the average. Norsworthy (7) found these per cents to be considerably higher. She very probably had on the whole a higher grade of defective children.

Conclusion

It seems a safe conclusion from the above data that not only is mental defect reflected on the average in the height and weight of children, but the more decided the defect the more checked the physical growth. (From Graph IV there may be an exception with girls before fourteen years.)

This is more evident in height than weight, the first being probably less subject to modification by regular habits of sleep, diet, etc., than the latter.

Feeble-minded girls more nearly approximate normal girls in weight than do feeble-minded boys approximate normal boys.

The commonly known fact that girls are taller and heavier than boys during early adolescence shows itself also with mental defectives.

Defective boys and girls are more variable in height than normal boys and girls. Before thirteen years, defective boys and girls of institution life are more constant in weight than normal boys and girls.

BIBLIOGRAPHY

1. Boas, F. The Growth of Toronto Children. Rep. Comm. Ed., 1896-7, Vol. 2, pp. 1541-1599.
2. Burk, Frederick. Growth of Children in Height and Weight. Amer. Jour. Psy., 1898, Vol. 9, pp. 253-326, q. v. for extended bibliog.
3. Gilbert, J. Allen. Researches on the Mental and Physical Development of School Children. Yale Psy. Laboratory Studies, 1894, Vol. 2, pp. 40-100.
4. Gilbert, J. Allen. Researches upon School Children and College Students. Univ. of Iowa St. in Psy., Vol. 1, pp. 1-39.
5. Goddard, Henry H. The Height & Weight of Feeble-Minded Children in American Institutions. Jour. of Ner. and Men. Dis., Apr. 1912, Vol. 39, No. 4, pp. 217-235.
6. MacDonald, Arthur. Experimental Studies of Children. Rep. Comm. Ed., 1897-98, Vol. 1, pp. 985-1204.
7. Norsworthy, Naomi. The Psychology of Mentally Deficient Children. Columbia Univ. Contrib., 1906, Vol. 15, No. 2.
8. Porter, W. Townsend. The Growth of St. Louis Children. Trans. Acad. Sc., St. Louis, 1894, Vol. 6, 263, q. v. for extended bibliog.
9. —— ——. Physical Basis of Precocity and Dullness. Ibid. 1892-4. Vol. 6, 161.
10. Shuttleworth, G. E. The Health and Physical Development of Idiots as Compared with Mentally Sound Children of the Same Age. Proc. Assoc. Med. Off. Amer. Instit. Idiotic and F. M. Persons, 1876-86, pp. 315-322.
11. Smedley, Fred. W. Child Study in Chicago. Rep. Comm. Ed., 1902, Vol. 1, pp. 1095-1138.
12. Tarbell, G. G. On the Height, Weight, and Relative Rate of Growth of Normal and Feeble-Minded Children. Proc. Assoc. Med. Off. Amer. Instit. Idiotic and F. M. Persons, 1876-86, pp. 188-189.
13. West, Gerald M. Observation of the Relation of Physical Development to Intellectual Ability made on the School Children of Toronto, Canada. A Preliminary Report. Science, N. S., 1896, Vol. 4, pp. 156-159.
14. Whipple, Guy M. Manual of Mental and Physical Tests, 1910. Warwick & York, Baltimore.
15. Wylie, A. R. T. Investigation Concerning the Weight and Height of Feeble-Minded Children. Jour. Psycho-Asthenics, 1899, Vol. 4, No. 2, pp. 47-57.
16. —— ——. Contribution to the Study of the Growth of the Feeble-Minded in Height and Weight. Ibid. 1903, Vol. 8, No. 1, pp. 2-7.

THE PSYCHOLOGY OF THE BOY SCOUT MOVEMENT

By M. Jane Reaney, B. Sc.

The Boy Scout—the very name calls up a vivid picture,—a romantic little figure,—bare knees, slouch hat, pole, belt filled with numberless mysterious implements—and to those of us who have some inner knowledge of the movement it is not the externals alone that appeal. We have had experience of the chivalry, the resourcefulness, the self-control of the Boy whose motto is "Be prepared."

Six years ago Sir Robert Baden Powell started the movement—to-day it is world-wide. The Boy Scout is a familiar and popular figure in every land, and many of the leaders of the present time do not hesitate to consider the Boy Scout movement as the most far-reaching and significant movement of modern times. What is the reason of this? What is there in the Scout that has appealed so tremendously to the boyhood of the world?—that has changed so many of the hooligans of our cities into well-ordered useful members of society?

The answers to these questions are not far to seek. By some almost incomprehensible stroke of genius the originator of the movement has shown such a profound, though it may be unconscious, knowledge of psychology of the boy mind that he has devised a scheme that appeals to it in every sense. It has caught hold of the romantic adventure-loving soul of the eternal child—the soul that is the same in all times and nations and has given it that which it misses in the rush and stress of our over-civilized life.

It is not the purpose of this article to discuss the details of the Boy Scout movement or the splendid results which are universally known. Rather we must try to analyse the reasons for its remarkable success especially amongst children of the lower classes to whom games, as such, do not appeal so strongly.

The Study of Child Psychology has made great strides in recent years, but the science is still only in its infancy. We have, however, already come to the conclusion that the child must not be regarded as the immature man, and that his mind is of a more primitive type, and probably in its development follows the stages through which the race has passed.

Again we are losing the old idea that man, as an intelligent being, has few instincts, and the theory is gaining ground that he possesses a very large number of instincts, but that these are modified by intelligence to such an extent that it is difficult to recognize them in the adult. Mr. MacDougall, in his book on Social Psychology, suggests "that directly or indirectly the instincts are the prime movers of all human activity. . . . The instinctive impulses determine the ends of all activities and supply the driving power by which all mental activities are sustained." Again we are beginning to realize that these instincts appear at different stages of development and that if they are stunted or perverted great injury may result to the individual. Freud and his followers have proved in connection with their work on psychoanalysis that much of the neurotic tendencies of adult life can be traced to the suppression of instinctive desires in childhood.

The period of infancy and immaturity lengthens as we come up the animal scale, and it is during this period that the play activity develops so strongly. Karl Groos, in his classic work on the Play of Man, suggests "that the very significance of youth is due in part to the necessity of play: the animal does not play because he is young, he has a period of youth because he must play." It is by play that the developing instincts are given scope and means of expression and it is only by watching carefully the way in which children play that we realize the times and ages at which the principal instincts appear. For in play a child is unconscious. Free and untrammeled by the masterful will of the adult he expresses himself without fear.

It is often pathetic to see how a child realizes that the grown-up fails utterly to understand his point of view. For the mind of the child is much nearer the mind of the savage than that of the civilized adult, but few there are of us who have sufficiently vivid memories of our childhood to realize this. His ways of looking at things differ widely from ours—his ideals are simpler—his logic more relentless.

Many observers of children's play have noticed that certain types of games appeal to children at different ages. We can roughly divide the play periods into three distinct groups:

(1) The age of dramatic play.
(2) The age of rivalry and self-assertive play.
(3) The age of loyalty and co-operative play.

These periods naturally have no abrupt division and tend gradually to merge into each other, but at the age of nine or ten the marked tendency towards dramatic play is displaced by a strong sense of rivalry and self-assertiveness. The boy is no longer satisfied with make believe. He becomes critical, he wants to do—to make things. He wants to fight for the sake of fighting. It is at this age that we hear so often the expression " I can do this better than you." There is a keen desire to beat others and the games that foster this, together with those that make use of the hunting and fighting instincts are most popular. Romance looms large in the form of love of adventure. This is the stage when the boy plays truant, and when the stronger spirits run away to sea.

We are only just beginning to realize that the child is but fulfilling his destiny, he is going through the stages of the race. To him the simple qualities such as strength, prowess, bravery, appeal. His mind cannot appreciate the passive virtues and the adult who attempts to instill them is often regarded with pity or contempt. He is one with the savage ' brave ' and the things which appealed to our remote ancestors appeal to him. Now is the time, if his instincts are not thwarted, to cultivate these stalwart primitive traits and make them his servants for future life. The boy at this stage is a ' cub ' and in many cases a disagreeable cub, because we do not know how to deal with his ' cubbishness.' It is but Nature asserting herself when the child of gentle nurture prefers to play at ' slaughter house ' rather than the kindergarten game involving raindrops and flowers.

During this period of growth there is a marked want of co-operation. The child needs a leader for all games which involve working together with others. Team games do not appeal to him, as such, and even if he is taught to play these, individualism remains the most dominant feature.

But at the dawn of adolescence a change in his outlook appears. The boy fails to understand himself. Romance appeals to him even more than previously, but it is the romance of high adventure and fine achievement. He must have a hero to worship. The spirit of co-operation arises. The old individualistic fighting games are not enough for him. At this stage group games such as football and hockey become most popular. Gangs and clubs are formed. The feeling of group consciousness arises. The idea of self-suppression, of working, as part of a greater whole, has a strong appeal which shows itself, not only in the magnificent co-operation of a football team, but in the loyalty to the leader of a hooligan gang. For the gang is but a perverted expression of the desire for co-operation: it is the primitive social group. In the boy of more fortunate surroundings this point shows itself in the love of the game, and the Games Captain often becomes a hero to worship and copy.

But in the classes where the fight for life is more strenuous the game, as such, does not appeal so strongly; it is not sufficiently utilitarian. It does not obviously prepare for after life. It is to the child of this class, at this stage, that the Boy Scout movement has come as a godsend. He stands at the threshold of life full of unfulfilled desires. He longs for romantic adventures but his life is sordid. He loves doing—he must be ever occupied, his hands ache to make 'Things.' He wants a hero on whom he can set his budding affections—a hero whose character he can understand and copy. The passive virtues required in school and office are not for him—his hunting and fighting instincts are too powerful—he would like to be sailor or soldier. His gregarious instinct is coming to the surface, he wants to be a unit, amongst other units of a great barbaric whole. In fact, the crude spirit of primitive man is working in him. He wants to be a cause, he must make himself felt. And he does, but often in ways which we deplore. But he becomes a Scout and all these seething desires seem satisfied, his fierce longings are quelled. Romance comes to meet him. He lives in camp the life of his favorite pioneer on the outskirts of civilization. He does interesting things—he learns to make common useful things in a romantic way—a hero is set before him who has the virtues he can understand—he is one of a group all working towards an end, at the same time his individuality is not suppressed,—his desire for rivalry is satisfied—he now aims at making his patrol, his company, the best. His crude love of dressing up, his fondness for pomp, ceremony, display, all find their place. He can grasp and understand the simple doctrine of the Scout Law. His innate love of being ruled by one stronger than himself, his real love of implicit obedience—a desire which is latent in every child—finds scope, his sense of respect for office,—a sense often killed by our modern tendencies,—is fostered and makes the groundwork of his respect for law and order. He is making, doing, living a life of chivalry and adventure. He is filled with passionate loyalty to a cause. He is in all thoroughly interested. The scheme fits in so absolutely with his constructive demands. And above all and through it all runs the feeling at the back of his mind that he is free—he is not being coerced to do these things, he is doing them of his own free will: in other words he is playing a splendid game.

Therein lies, I believe, the secret of the success of the Boy Scout Movement. It satisfies an instinctive need, and therefore it appeals to the interests of the universal boy mind. And in appealing to these interests it takes hold in a way that the ordinary school education cannot, or at least does not. It appeals to him and interests him because it shows him ways and means suited to his stage of development. He understands why he learns to cook with few implements—to splice ropes—to do mechanics in order to understand the mechanism of a bicycle, arithmetic in order to be able to work out a scheme for billeting a company. He is implicitly obedient to the Scout leader, not because he must be, but because he knows the whole spirit of the cause would be lost if he were not. He suffers hardship—he gives up his place to another—he does a subordinate job without grumbling, because he realizes he is but part of a concrete interesting whole, and the success of this whole means much more to him than his own. The spirit of the Game pervades him, but it is a game the use and value of which he realizes—a game which enables him to approach more and more to the standard of his ideal. Therein, I believe, lies the secret of the Boy Scout Movement. It is a splendid Game that satisfies entirely the needs of the boy at this stage of his development. And herein lies the secret of its great achievement. Having got the boy, body and soul, by an appeal to the things he can understand, it makes use of his interest, his loyalty, his suggestibility—to inculcate the more subtle virtues of purity, justice, honor and uprightness which go towards that which is the goal of all education—the making of a good citizen and a good man.

NOTES ON THE TALK OF A TWO-AND-A-HALF YEAR OLD BOY

By Alice D. Snyder, Vassar College

(I was living with the child most of the time from the middle of June, when he was two years and five months old, until the middle of September. Very frequently throughout the summer I would take down as accurately as possible everything that he said during a continuous conversation. Moreover I was always on the lookout for data on certain interesting questions, and noted down such data whether the significant remarks were made during an observation period or not. Of course the notes from which I have generalized embody only a very small fraction of the summer's talk. The observation periods, though frequent, were not regular. My notes are by no means conclusive, even as regards this one child, simply suggestive.)

Analysis of Sentence Types

As was to be expected, a large proportion of sentences were imperative. These were easily accounted for.—Problem: to analyze and define other types in their relation to the imperative. (Exclamations here ignored, as not co-ordinate with more fully differentiated types.) Hence problem resolves itself into—

Relation of questions and declarations to the imperative.

(Definition of two fundamental sentence types: *Imperative,*—any sentence that is a direct means to an end, that calls for an action-response. *Declarative,*—any sentence that is used to express, define, that is to a degree complete in itself, whose value does not depend primarily upon a response.)

I. *Questions.*

Simplest questions ordinarily recognised by psychologists as questions are those involving such interrogative words as "What" and "Why." These naturally a rather late development, far removed from the child's early imperatives, for they indicate an interest in the "relation of images"[1] and, according to Sully (whose "simplest form of question" is of the type, "What is this insect?"), they are the "outcome of ignorance, coupled with a belief in the boundless knowledge of grown up people." They show "that the child, by a half conscious process of reflection and reasoning, has found his way to the truth that things have their qualities, their belongings, their names." [2]

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[1] *Cf.* King, The Psychology of the Child.

Such questions are the counterpart of declarations rather than of imperatives, for they indicate an interest in facts as facts. Moreover, they are much less simple than declarations, even. According to Sully they seem to be a somewhat blind groping after knowledge, after no one thing or name that is definitely suggested, but after almost anything that will connect itself with the new experience; they are not the expression of some image that is definitely suggested by the experience. The only positive motive seems to be the very general notion that things have their names, etc., the image a very abstract one.

I was interested in noting many earlier sentences that evinced apparently simpler mental processes and yet were to all intents and purposes questions. Various classes of these:

A (frequent). Simple variations of the imperative—the means to some end in which the child took an active interest —requests, though uttered with a real question intonation.

Ex.—More play ball?
Want play ball?
Like go out dat boat?

The child was working for the accomplishment of his own ends as truly as when he was using the form of command. He was suggesting that you should like to go out in the boat much more than he was asking in a disinterested way for information about your preferences. Yet in a sense these seemed to be real questions, for the imperative proper meant to the child immediate, or relatively immediate, control of a situation.

The request showed the recognition of an intermediate factor,—the disposition of the second person involved. This demands a different sort of control—hence the pleading tone; moreover, in the case of the request an element of uncertainty comes into consciousness; there is a need for information;—*knowledge,* the demand is for a verbal rather than an active response. Hence the hesitation, the rising inflection, etc.

B. Requests for permission, rather than for active coöperation. These again in the form of questions about another's likes. Again, a pretty direct means to an end.

C. Requests for approbation as well as for permission, as when he said, "Want blind shut?" "Want flag down?" He was trying to assure himself of the spectator's approval, to realize a suggestion which, if realized, strongly reinforced his original interest in the act. A favorable response meant not simply the removal of a possible check to action, but added delight through sympathy with another's enjoyment. Indeed, the act for which the child asked approbation was sometimes first suggested by a sympathetic interest in what some one else was doing, as, for instance, when he would ask, "Want me help you up steps?"

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[2] Studies in Childhood.

In all three classes noted the question request was intimately connected with some overt act of the child's. This was almost always the case. Only occasionally would he ask about another's likes when they had no connection with any act of his own.

D. Questions of fact, etc.—questions that were not mere variations of the imperative, but rather the counterpart of the declaration.

1. Class represented by such questions—half question, half exclamation, as, "Big noise?" "Big joke?"

Here the child's interest was to some extent in facts, names, in images abstracted from the activity, not so much in what he could do with the thing as in what he could say about it.[3] Or, to be more exact, what he wanted to *do* to the thing was to have it named. But even these questions were far simpler than the child's "What"s and "Why"s. Here again the child was by no means asking in a disinterested way for the name of the thing nor even asking whether it was a "big joke" or not. He was rather suggesting that it should be called a "big joke." The phrase was suggested to him by association; the situation was incomplete without it; hence he would try it, hoping for corroboration. He wished to hear someone say "Big joke." No more than in the imperative question request, was the question here an unguided feeling out after knowledge; it was a tentative statement of a suggestion that he wanted to realize.

That all such questions, whether of fact or of volition, were tentative statements or suggestions rather than unguided speculation, is confirmed by the child's manner of replying to questions. At least, this hypothesis would account for a manner of responding which might otherwise be difficult to explain. In common with various children whose records I have been reading, this child would hardly ever say "yes." Sometimes he would use "do" as an affirmative response;

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[3] *Cf.* King.

more often he would answer "No," as a purely arbitrary means of getting rid of an obnoxious questioner. I have not seen any explanation of this habit; but if the questions of others meant to the child the sort of positive suggestion that his own questions evidently meant, it is easy to see why he should form the habit of saying "Do" and "No" before he learned to say "Yes." For the only questions asked the child that really demanded an affirmative response were questions as to what he wanted to do or have, questions to which he naturally replied by repeating the "Do" from the "Do you?" of the question. If the question did not regard his wants it called for no reply unless it were negative. For if asked whether something he was eating was good, the question did not imply a doubt that he must allay, it simply suggested that the thing was good, and that he knew already. What was there to do or say about it? When the response called for would be negative, the matter was very different; then there was a sharp contradiction between the thing suggested and the real state of affairs, and the child had to reconcile the two by negating the affirmative suggestion of the question. (Possibly the fact that "yes" is a difficult word is a sufficient explanation.)

2. Finally toward the end of the summer appeared the questions which are universally recognised as such, questions involving interrogative words, and these offered a different problem. (Even these questions, "What doing?" "What dat?" seemed simpler than what Sully cites as the simplest form—"What is this insect? These asked only for names, Sully's for definition of something already named.) In the questions "What dat?" etc., there was no concrete word image suggested which the child was using tentatively. It was natural enough that he should think of a small black thing as a fly and want to have his nomenclature confirmed; it was a very different thing to think of it as a "What." Here the image which prompted the question was not some definite word which had been previously experienced as part of a similar situation; but a vague "what" belonging to things and acts in general, to nothing in particular. Yet I found myself wondering whether these questions were so essentially different from the earlier ones that they alone had the right to the name,—whether the "what" sense, the abstract sense of things as things with qualities and names—whether curiosity, or a blind reaching out after knowledge, *any* knowledge which would satisfy this vague sense, was strong enough

at this age to account for the ceaseless repetition of "What dat?" and "What doing?" It seemed as though the speculative interest must always have been pretty strongly reinforced by something in the particular situation which called for this response. As a matter of fact, I think these questions were demands rather than disinterested inquiries, and demands for recognition rather than for knowledge. Such questions were frequently asked when the child was watching another person do some piece of work which prevented his giving to the child the the attention he considered his due. Unoccupied himself, watching an act in which he had no part, he was restless. He *would* have some part in the proceeding, he *would* be taken into partnership, so to speak. If he could not assist, he could at least draw the worker into conversation. His real motive was the general but insistent one of demand for recognition. A relatively faint speculative interest in the "whats" and "wherefores" of things offered the particular channel for gaining this recognition.

II. *Declarations.*

A. Many, while declarative in form, were in function mere variations of the imperative—like the question requests.

"Might do ———"
"Want do ———"

B. Many, however, were declarative in function as well as in form. Two classes,—Personal, and Impersonal.

1. The personal declarations of fact,—declarations of which the subject, expressed or implied, was often "I." These contained *many real verbs, action verbs.* The statement usually preceded the act and in form suggested futurity. The ordinary formula was not "I do——" but "I go do——" as

"I go get down."
"I go throw in water."

In a way such statements served as requests for permission and as bids for the approbation of the onlooker; but more than this they served to define, to objectify, the child's acts for himself. He was, by the very process of naming, to some extent making of the act an end to be accomplished. Interest was centered to some extent in the end rather than in the activity itself.

2. Impersonal declarations of fact. These, on the other hand, *contained very few real action verbs.* Verb was usually "is" (understood), "has," or "got." Was simply naming thing or its attributes. The real action verbs that some-

times appeared were frequently called forth by some especially startling or interesting occurrence:

"Whip fall."
"Hair come down."
"Big cow scratch ear foot."
"Rain come all through roof."

The commonest sentences of this type, however, were of the form,

"Dat tree dere."
"Dat water dere."
"Dat nice water."
or, "Fly dere."
"Fly on dat big stone."
or, subject omitted, "All dark."
"All gone now."
"Big stone."

These evinced a real interest in naming things,—situation was incomplete without a name.

DEFINITIONS

During the summer the child had not reached the stage of asking for "definitions" of objects—simply for names and occasionally causes. Presumably he would not have given "definitions" if asked what things were. But a few months later (age—two years and eleven months) he was willing to reply to such questions as "What is a clock?"

These definitions took the form,—"So do ———." The child went straight to the point, to the particularizing element of the definition; there was no room for any concept such as "a thing" followed by "which." While the definitions gave the habitual activity or employment of a thing, they often failed to give its real use as recognised by adults. A towel was "So get hands dry," but an apron was merely "So keep it on." The definition which revealed in the most delightful way the real significance the object had for the child was that of a cat. A cat was—"So keep tail on."

(Prevalence of utilitarian ideas in children's definitions noted by Binet, Chamberlain, etc.)

FIGURES

Very little material on metaphors and similes. Metaphors more common than similes. Applied, as a matter of course, the term "big cow" to anything at all frightful (had once been frightened by a cow). At the same time he was using the epithet in its literal sense. Would call any small black thing a fly.

Occasionally used "like." Once said "Dat stone like big cow." The other occasions on which he differentiated to the degree implied by the *simile* were in cases where he himself was one of the elements being discriminated—"I go fast just like auto," etc. *Seemed* more apt to use simile form "like" with acts than with things, but not enough data to judge.

The only times he seemed to take pleasure in the figurative element, to be conscious of it, in fact, were in cases where he had been taught to make-believe, to play some game.

It was noticeable that when *pretending* entered a sphere that concerned him too closely, when it involved the integrity of his personality, he would immediately work the case out into literal, fact form. For instance, he would make sand houses with me, happily agreeing that a hole was a window, a stick a chimney, etc. But when I took a stone and said, "That is H—— [his name], going in the door," he immediately demurred—"Dat not H——!" Several months later when I was trying to persuade him to take a nap, I unfortunately said, "Now H—— is sound asleep." He not only denied the assertion, but really argued the case (a thing he was not in the habit of doing). He called attention to the fact that his eyes were open, and then got up, walked around the room, and announced "I'm walking."

THE CHILD'S USE OF THE NEGATIVE

1. Position of the negative word. (Sully and Major note that the child frequently forms negatives by placing "no" at the beginning or end of an affirmative sentence.) This child at the beginning of the summer said—"Touch it no" and "Shoe all gone no." But he soon learned to use "not," "don't" and "won't" quite normally.

2. Many negative imperatives and statements of his likes—or dislikes. These were of course called forth by positive suggestions (in words or acts) that concerned him nearly and had to be negated. Ex.—"Don't go near that chair." "Don't want ———."

3. Negative statements of fact (objective). These were ordinarily startled out of the child by a sudden interruption of the familiar, by the failure of the expected to happen. The child had not learned to reason about these phenomena, at least not to ask the why's and wherefore's. He simply called attention to them; as a matter of fact, this was sufficient. The difficulty, if difficulty it were, was ordinarily immediately remedied for him.

4. As already noted, negative responses were frequently used in a purely arbitrary way. If asked whether he could say "Uncle Harry" the child would, as likely as not, reply, "No, I can't say 'Uncle Harry.'"

5. *A peculiar use of the negative, apparently typical of children of this age—the use of antithetic statements.* This was noted by various psychologists.[4] Explanations offered: serves to bring out meaning; gives practise in the rudiments of reason; indicates independent observation; shows a delight in fickleness.

I recorded a number of instances:

Not go out dat boat; go out big boat.
Not dat boat hot; dat boat hot.
Dat not pretty tight; dat pretty tight.
Not put pipe in mouth; Brother L—— put pipe in mouth.
Not go too far out; Dadda and Mother go too far out.

a. Instances which were closely related to the child's immediate interests—in which there was a definite end in view, hence a definite right and wrong, one suggestion which would not satisfy and must be negated, another which would satisfy, a positive in which he could rest. These were more than "independent observation" and were possibly more than "practise in the rudiments of reason." They were of more immediate significance than would seem to be indicated.

(1.) The negative may sometimes have been an actual stage in defining the positive for himself rather than a method of bringing out a meaning already defined. For instance, when the child said, "Not go out dat boat; go out big boat," it is quite conceivable that he settled first upon the wrong boat by chance, and that he was forced to reason, to distinguish, until he found the right boat, the one in which he might go out. The negative may have been a real step toward the positive. In such sentences as "Not go too far out," "Not put pipe in mouth," the negative was clearly suggested by the prohibition of some act which he was interested in performing. Here again the child went on to discover a positive in which he could rest; but here he gave up trying to find the particular thing he might *do,* and simply philosophized about the matter, distinguishing between himself and other people until he found a positive *statement* which was satisfactory.

(2.) Sometimes the negative followed the affirmative instead of preceding it. Here the use seemed somewhat more arbitrary. For instance, when he would say, correctly enough,

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[4] *Cf.* Preyer; Dearborn, Motor-Sensory Development; Sully, Studies in Childhood; Miss Hogan, Study of a Child; Tanner, The Child.

"Dat boat," and then add "not dat boat way over dere," the negative seemed more like an after-thought than like a stage in the child's own particularizing process, though it certainly served to "bring out his meaning." I fancy the child sometimes rather deliberately suggested the wrong boat for the sake of enhancing the delights of conceiving the right one. The pleasure doubtless consisted largely in the closer definition involved, and in so far was rational. But I think there was another element—that the boy shared to some extent the feeling of the naughty boy who wants to see how near he can come to doing the forbidden thing without quite doing it. To suggest the wrong boat and then the right one gave him more than a sense of delightfully definite perception; it gave a sense of power, of control, that he enjoyed using somewhat arbitrarily.

b. More arbitrary cases, in which there was no definite end, no right and wrong. The child would say, touching one boat and then another, "Dat boat hot; not dat boat hot," or, dipping his toy frog in the water and taking it out again, "He wet now; he dry now." Presumably he didn't care in the slightest whether the boat was hot or cold, whether the frog was wet or dry. These instances suggested more strongly the "independent observation" of Preyer, and the delight which Dearborn finds in the child's comparing brown bread and white bread.

They indicate something more than these, however. The child was observing even here in a perfectly rational way. He was not simply vacillating between any two perceptions that chanced, but he was definitely comparing with respect to some unifying element, such as temperature, which had at some time been of considerable significance. He was at least getting practise in the rudiments of reason. Moreover I think that in such cases he was not simply reasoning but to some degree consciously creating. In the case of the frog the child was actually making it, now wet and now dry. When he said, "Dat boat hot; not dat boat hot," he did not first feel of the boats and then comment on them, but when he said "dat boat hot," he would touch it, thus making his finger feel hot, and then again cold. It may be of significance that he so often distinguished between "this" and "that," or rather between two "that"s, indicating first one and then the other, for here by gesture and other means he was very *actively* identifying himself first with one and then with the other. In as far as he was acting and not merely speculating, again, he was acting in a rational manner—not in a hit or miss fashion. He was creating in accordance with some principle such as size, temperature or wetness.

The use of antithesis, then, even when it seemed to serve no immediate purpose, was in itself a constructive activity—more definitely constructive than is suggested by such epithets as "fickleness" and "independent observation"—and a little more of an activity than is suggested by saying that it gives "practise in the rudiments of reason" or serves to "bring out the child's meaning."

PROGRESSIVE DEFINITION OF PERCEPTION

Many instances noted in which the child corrected a vague or incorrect sentence to make it more definite or exact. This habit of correction is noted by Preyer and others; I have never seen it commented upon except as proof that the child took no delight in deception.

1. The largest number of corrections I noted consisted in the addition of a modifier to a noun to make it more definite.

All gone tail—Pony tail all gone.
Bo—Sailboat on water.
Dat water—Dat dirty water.
I want lie on pillow—I want lie on this pillow.

2. Closely allied to these were cases in which the child corrected the modifier used. Certain phrases learned *in toto* were sometimes used quite mechanically. For instance, things the child talked about throwing away were ordinarily "old things," and it was a real effort for him to dissociate the adjective "old" from the object of the verb "throw away." Hence a case demanding correction:

Got throw dat ol—dat pretty box way.
I want throw dat ol—dat big stone way.

3. Sometimes the noun itself was changed to be more definite.

Might take paddle out boat—Might take paddle out canoe.

The most interesting case of such amendation was in the following series of sentences, fairly climatic in arrangement (noted down later from memory, but I think accurately). The child was almost talking to himself, evidently delighting in the successive stages of definition:

Train go on track.
Car go on track.
Wheel go on track.
Little wheel go on track.

4. Occasionally correction took form of insertion of adverb to define act more exactly.

Like bump?
Like bump very gently?

5. Sometimes he would supply in second version an element essential to a grammatically complete sentence—the subject or object of a verb, for instance:

Don't let way out—Don't let oar way out.
All gone—Frog all gone.

6. Finally the correction would take the form of adopting a normal sentence order.

Down sand beach I been—I been down sand beach.

Complex and Compound Sentences

(Comparatively little interest seems to have been taken in the development of complex and compound sentences—especially in the early forms where the conjuctions and relatives are not explicit.)

1. Relatives, etc.

In the course of the summer I noted a number of complex sentences involving relative clauses, though the relative was not always expressed.

Where and *What* were expressed.

Dat what make pony go.
I don't know where M. put dose.

Where and *What* were naturally much more significant words than *Which* and *That:* he was often asked where or what something was; moreover they were essential elements of his sentences—they served as substantives that had not been expressed.

The case of the pure relatives was different: There was no need of expressing them, for they represented a substantive that had already been expressed—indicated merely a change in function.

Hear big noise whip makes.
Might go in track auto made.

The words *track* and *noise* carried over into the relative clauses, and the fact that they were functioning in new ways was not of sufficient importance to the child (nor would it be to most adults) to call for a new word.

2. Cause and effect relations.

Before conjunctions were used to any extent the child was using what were in effect compound sentences—semicolon sentences. When the relation between the two clauses was close enough to warrant their being called one sentence, it was most frequently that of cause and effect.

These sentences did not, however, evince any interest in the "concept of causality," any cold-blooded reasoning.

Usually the clause which might have been introduced by *because* was used to re-inforce a demand—was part of an imperative.

> Don't fall; might hurt you.
> Don't carry me; too heavy.
> Don't put arm around me; I all right.

The *because* clauses here were to some extent mechanical repetitions: This was not the case, though, in the following instances:

> Please get my spoon for me; I can't eat.
> Please carry me; grass wet.

And even here the explicit statement of the reason was part, not of an observation of fact, but of an urgent imperative.

Occasionally the cause and effect relation appeared in sentences which were declarative in form. In such cases, however, the inferences drawn stated not a simple fact but some act that must be performed.

> My hand cold; must put in pockets.
> He cold, got put on sweater.

When the cause and effect relation was first made explicit, it was by the use of the conjunctive adverb *so*. I have very little data on this subject, but it seems reasonable that *so* should appear before *because*, if, as Compayré says, children narrate in order of occurrence, since *so* looks forward.

It is noticeable that these instances in which cause and effect appeared as such—were dissociated—were instances where there was a real contrast between the actual condition suggested and the condition desired—where the act suggested by one clause very evidently did something, negated some actual or strongly suggested condition, such as coldness or inability to eat.

3. Compounding by means of *too* and *and*.

As a means of compounding *too* appeared slightly before *and*. In looking at a picture the child would say, not "lady and big man," but "lady big man *too*." He separated what he saw into two distinct perceptions, in which he lost sight of the unifying element; but, having expressed them as thus

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[6] Later Infancy of the Child.

distinct, he would suddenly unite them again by the word *too.* The process he went through was very evident in one case, where he said:

"Pony lie down; big cow lie down; big cow lie down *too.*"

The use of *and* did not show, of course, the same separation into distinct perceptions. The sense of sameness seemed to be present throughout and did not come as a surprise at the end. In fact the child seemed to delight in this sense of sameness. He would frequently repeat as much instead of as little of the sentence as possible.

"I have stand on water and have get out boat."

"I put foot up dere and climb over and put foot in dere and climb over."

"Mamma row and Dadda row and H—— row."

Presumably the child was almost incapable of further organisation—he had to utter clauses as wholes—could not easily hold off the verb until he had compounded the subject—but this does not alter the fact that his *and* sentences unlike the *too* sentences showed him to be fairly luxuriating in repetition, in sameness; he would sometimes utter them in a fairly sing-song fashion.

4. *Before* used occasionally.

HOW A KNOWLEDGE OF THE CHARACTERISTICS OF THE ADOLESCENT BOY MAY AID ONE IN DIRECTING HIS CONDUCT

By Mrs. Emma E. Kuno, University of California

A knowledge of the characteristics of the adolescent will enable the parent or teacher to see how he differs from the child on the one hand and from the adult on the other, and to regulate her treatment of him accordingly. It is a sad fact that more boys go wrong because of unwise handling than because of innate wickedness. The problem, therefore, that presents itself to every guardian of youth is not so much how to get along with a boy for the time being, as how to develop in him the ability to direct his own conduct; in short, to make of him the man that it is possible for him to be.

Because of the fact that adolescent intellectual and emotional changes are based upon physical change, it is difficult in some instances to determine whether given characteristics are physical, intellectual, or emotional. However, for the sake of convenience, I have classified them under these heads and shall take them up in order.

Physical Characteristics

The period of adolescence, from fourteen to twenty years of age, is one of rapid physical change and resultant instability. The different parts of the body grow at unequal rates and mature at different times, the organism being a unit in which each part seems to go its own way at its individual rate of speed.

1. *Fickleness of Appetite.*—A physical characteristic with which the parent rather than the teacher usually has to deal, unless it be in a boarding school, is fickleness of appetite. A child who has been trained from his infancy to eat what is set before him and whose mother has not made herself a slave to his fancies, is less likely than one who has been "spoiled" to be fastidious during adolescent years. Yet in some cases, even boys sternly trained become whimsical during adolescence. The characteristic usually appears at about the age of fourteen. It should be recognized as a physiological change that cannot be overcome by scolding or, during the

earlier years of adolescence, even by reasoning. One method of approach would be to first ascertain whether the food rejected disagreed with the boy, or whether his aversion to it was due to some hygienic tenet or religious belief. In such case, his feelings should be respected, and even though his guardian might not believe as he did, he should not be compelled to eat of the food. However, if it should prove to be merely a case of fickleness, although it would be best not to offer him the same kind of food for some time, yet it should appear on the table again within the course of a week or two, and if he did not then care to eat it, nothing should be substituted for it, but he should be left to make a meal of the things on the table. No special dishes should be prepared for him, and above all, he should not be "coaxed." While it is natural that the adolescent experience whims of appetite, the fixing of these whims may generally be charged to the indulgence of the parent.

I have in mind a case in which the mother continually catered to the appetite of her growing son. No matter what the menu might be she was always careful to find out what "Joe" would like and to prepare certain dishes for him. By this method his fickleness was not only fixed but greatly increased and it became difficult for even this painstaking mother to prepare anything to suit his taste. He grew to be an imperious and extremely selfish man, and if rumor is to be trusted, he is one of the most disagreeable and hardest persons imaginable to feed. Even when his wife tries her best to please him, he frequently pushes everything from him and leaves the house because there is nothing for him to eat.

I once knew a father, who instead of going ahead and serving each with whatever came next, made the dinner hour miserable by asking each of his children which particular cut of the roast or fowl he preferred and whether he cared for a little of this kind of vegetable, gravy, etc. At least one of these children grew up to be the kind of person one would not care to invite to dinner.

But, happily, I know of another instance in which this characteristic was dealt with in a way that I can heartily recommend. Two adolescent children, a girl and a boy, were entrusted upon the death of their mother, to the care of a maiden aunt. The first difficulty that arose in their new surroundings was because of their appetites. At first she tried to reason with them, but finding this of no avail and having ascertained that the food they refused agreed with them, she said nothing more, but was careful to see that each meal afforded a variety of wholesome food besides plenty of bread and jam. These two stubborn young people ate bread and jam for nearly a week and often asked to be excused from the table after having eaten but very little. Finally, however, as no notice was taken of it, they began to eat other things, little by little. Gradually, the aunt was able to interest them in the physiological values of different foods and the benefits to be derived from variety. Their preferences were thus transferred to the intellectual realm, and now, three years later, they relish what is set before them and show no decided preference for jam. By her patience and tact, this aunt has done much both for the bodies and dispositions of these young people.

2. *An Abundance of Life and Vigor, and a Desire to Achieve, to Do, to Earn.*—This is a characteristic upon which the world depends for progress, and it should in no wise be suppressed. Unfortunately, however, it asserts itself during the early adolescent years just as the boy is beginning his high school course and makes him determined to leave school and get out into the world. An early adolescent is not amenable to reason on this point, and the argument that by leaving school when but half-educated he will compromise his future and never be able to fill a high place in the world, has little effect on him. He sees the opportunity for immediate gain and feels the fever in his blood.

The school, especially during the past decade, has done much toward solving this problem by the introduction of vocational studies which enable a boy to prepare himself along his chosen line and pursue culture subjects at the same time. A choice of subjects is offered him and thus many boys are held in school who would otherwise have drifted away. Sometimes a teacher is better fitted than a parent to discover a boy's particular bent and to lead him into lines in which he may find both profit and pleasure. He is thus held in school and at the same time given something that will further his life work.

The desire to take part in active life is sometimes satisfied by getting something for the boy to do after school which will bring him financial reward; or, if money is not his object, by either giving him some definite, constructive work to do at home, or by interesting him in an avocation which will satisfy his craving. A boy may thus be led on and kept in school until, as he nears the end of the high school course, he becomes willing to complete it of his own volition. The group influence helps to keep him in school during the last year, for he feels that it would be a disgrace to drop out and not graduate with his class. In a case which I have been observing, the boy has thus been led along gently, term by term, until now, after having completed two years of high school work, instead of desiring to quit and apprentice himself to a saddler as was his intention, he has resolved to become an engineer. With this in view he has determined of his own free will not only to continue in the High School but to go on to the University.

If, after the completion of the High School course, a boy has no desire to go to College, I believe it is wrong to insist upon his going. A college education which is forced upon a boy who does not value it can do him little good, and his time might be better spent in active life.

Although it is often possible by the exercise of tact to hold boys in school until they have completed the High School course, the desire to achieve is too strong in others to be thus postponed. This is especially true in large cities where their associates are daily enlisting in the army of the world's workers. In a case of this kind it is perhaps best to permit a boy to leave school upon the completion of the Grammar School course, but both teachers and parents should endeavor to stimulate in him an ambition to continue some line of self-improvement. A boy thus guided may in the end prove a more intelligent citizen than one forced to continue in school when his heart is elsewhere. As adolescence is a time of change, it often happens that after a few years of business life, a boy reared in an atmosphere of culture voluntarily registers in college and resumes his studies with a relish.

In some boys, however, the desire to achieve must be stimulated instead of restrained, in which case the problem of the guardian is equally great. Work was given to man not for work's sake but for man's, and if we are to make a boy self-reliant and manly it is imperative that we furnish him with abundant opportunity for self-expression, and interest him in some definite line of work or athletics. No boy should be permitted to form the habit of idling away his leisure. The busy boy escapes many temptations.

3. *Sexual Desire.*—This is often strong in adolescent boys and in some there is little native power of control. There are many ways in which a teacher may help a boy along this line without his being conscious of it.

First, she should encourage athletics and other healthful exercise. This will to a great degree counteract the passion. She should also be careful not to keep him poring over his book long hours at a time, as sedentary life is conducive to its stimulation. In the assignment of home-work, she should take this into consideration and omit the non-essentials.

Second, she should be extremely careful in the selection of the literature and art which is put before her adolescent boys. Better, a thousand times, that our boys should grow up ignorant of the classic myths than that they be able to recite the details of all the vagaries of the gods and goddesses of Greece and have lost their manhood. Such stories may be taught with impunity to a younger child who does not comprehend their meaning, but a wise teacher in the High School will omit a great deal given in a modern text-book rather than run the risk of having adolescent minds dwelling upon that which is not pure. The same holds true with regard to pictures and works of art. Figures, such as formerly adorned our Sather gateway and such as the one that now stands in the center of our Museum of Anthropology here on the campus of the University of California, should be tabooed. The moral effect should always be considered before either the intellectual or the aesthetic.

Third, she should explain to her boys scientifically, and in a thoroughly impersonal way, the physiology of the body, and give them advice regarding its hygiene. Through her broad knowledge of sex as it exists in plants, in the lower animals, and in human beings, she will be able to make this subject infinitely more interesting than could the boy's older companions on the street. The teacher can bring before her boys the sacred function of sex and show them how dire are the consequences of its perversion. Having thus led up to the subject, it is not difficult to arouse in the average boy that sense of honor, that seed of ambition to be pure and manly, and that pride of race which will carry him through puberty to an untainted manhood.

Fourth, the wise teacher will not stop here but will do all in her power to keep temptation out of the way of the boys, realizing that while the spirit may be willing, the flesh is too often weak. She will warn them against the use of intoxicants, by which they would be robbed of their self-control, and against the dance, that curse of civilized society, which has perhaps done more than any other one thing to drag the boys and girls of our high schools and colleges into immorality. She will protest with voice and pen against this net ever being laid on the floor of her school-room for the feet of the young. Were our teachers fully informed on this subject, had they studied social pathology, visited rescue homes, learned the stories of the inmates, and kept themselves informed as to where many adolescent boys go after the dance, I believe that they would not lack the courage to lift up their voices against this evil, and I believe further that we should soon have a dance in which partners would be held at a distance of at least two feet and the present evils obliterated.

Fifth and last, but not least, it should be the constant endeavor of the teacher to so fill the minds of her pupils with the good that there will be no room for the evil. Adolescence is the age of hero-worship, and now is the time that the biographies of the good and great can be utilized to the best advantage. Positive teaching must accompany the negative if the latter is to be effective. Otherwise, the house is but swept and garnished ready for the occupation of seven other devils and the last state may be worse than the first. The boy must be led to consecrate himself to high ideals. The story of a grandfather who dropped in unexpectedly upon his grandson at college affords an instance of how the evil is sometimes driven out by the good. Walking in suddenly upon the boy in his room, the grandfather found its walls adorned with lewd and coarse pictures. He looked around in amazement but said nothing to the embarrassed youth. When Christmas came, however, he took occasion to present his grandson with a beautiful picture of the Christ, handsomely framed, with the request that he hang it on the wall of his room. When he next visited him, he found the character of the pictures on the boy's walls entirely changed, and the boy confessed that he could no longer endure such pictures in the presence of that face.

Intellectual Characteristics

1. *Imagination.*—The adolescent boy is possessed of a lively imagination and has a tendency to speak and act in the superlative. A knowledge of this characteristic will keep the teacher alert, save her much useless worry, and enable her to check the tendency by indirect methods. For instance, in her conversation or teaching she may quote the exaggerated statements of newspaper reporters and show what harm disregard of the plain truth has done. Then by her own careful speech and example she may exert over the boys an influence that will speak louder than words. The teacher that comes to school in the morning saying that she has just seen something that made her "hair stand on end" and her "heart stop beating" and that she is "almost frozen to death," while at the same time it is clear to all that she is enjoying her usual health, must not be surprised if her boys are given to romancing.

2. *Instability.*—It is difficult to hold the adolescent boy steady. So many possibilities present themselves that he

dwells upon no one thing for any length of time. Although this instability is most trying to the teacher or parent, it is a most hopeful characteristic in one sense because by it the mind is kept open and broadened. Again, if a boy has fallen into undesirable ways, it may be taken advantage of to direct him into other channels. He is not confined to a rut and his capacity for doing that which is right is as great as for doing that which is wrong. However, it is not advisable to encourage a boy to be a "Jack of All Trades" intellectually any more than physically, and he should be held by authority for a definite length of time to that which he has undertaken in order that a continuity may be established in his life.

Sometimes the migratory instinct asserts itself strongly and the adolescent boy may desire a change of scene and surroundings as well as of occupation. The parents should not be heart-broken because the boy insists upon leaving home, but, when they see that he is determined to go, should further rather than hinder his plans and thus be able to keep in touch with him and give him counsel in time of need. Sometimes a former teacher may do a great deal to keep a boy who has left home in the straight path by corresponding with him, and letting him know that she has faith in him and expects things of him. It not infrequently happens that a boy who is deaf to the entreaties of his parents will value the advice of his teacher. Perhaps the best cure for the wanderlust is to let the boy go and try his fortune in the world.

Fickleness of desire and a craving for variety and amusement may also be classified under the heading of instability. As the kind of recreation in which he indulges vitally affects the character of the adolescent, it is of the utmost importance that he be furnished with amusements which will in no wise lead him into temptation. In this connection I might quote the instance of a number of burglaries, committed by adolescents during a single week in Chicago, having been traced directly to the witnessing of a play, "The Gentleman Burglar," then running in one of the popular theaters. In case a guardian sees that an amusement for which an adolescent longs will be of positive injury to him, it is her duty to use authority in keeping him from indulging in it, provided other methods have no effect. At the same time, however, she should reason with him regarding it, bring before him its bad effects, and if possible, substitute for it something along the same line. In case, however, the pleasure for which the boy yearns is not wholly evil, it is best to give it to him in proper surroundings.

Another instance from the life of the adolescent boy left to the care of the maiden aunt affords an illustration in point. About a year ago, he and the group of High School boys with whom he associated showed an almost incontrollable desire to play cards, morning, noon and night. It so happened that most of the families to which these boys belonged frowned upon card playing. They not only regarded it as a great waste of time, but feared that it might lead to gambling. The boys were forbidden to touch the cards, but they soon began to play surreptitiously at noon and after school, in cellars and in downtown poolrooms. Finally, seeing that opposition was driving things from bad to worse, the maiden aunt made an agreement with the boys to the effect that if they would promise to refrain from card playing and attend strictly to their lessons during the week, they should have the privilege of coming to her home on Friday and Saturday evenings to play cards from seven until ten. The consent of the parents was gained and the boys came. On these evenings they were left in undisturbed possession of the dining-room, except for the presence of a big bowl of lemonade and a plate of cake. Neither the aunt nor any of the parents, however, retreated from the stand they had taken against card playing and the boys were conscious that this was but a concession to their weakness and that consent did not mean approval. They played two evenings a week at first; later, Friday was sufficient, and before the end of the school term they found that they sometimes preferred to devote even that evening to something else. This last winter not one of them has shown any desire to play cards. This same principle may be applied to amusements other than card playing. However, the question of providing suitable amusements for the young under wholesome conditions, and of safeguarding them against over-indulgence is one that taxes the utmost ingenuity of the guardians of youth.

3. *Reasoning Power.*—The reasoning power of the adolescent boy is active and he no longer accepts without question the opinions and mandates of others, neither does he make up his mind regarding a matter during a sitting. Knowing this, a teacher should not expect to impose her point of view upon the boy. She will meet with better success if she tries to get his point of view, reasons with him, and gives him time to come to conclusions. The old adage,

> "Convince a man against his will,
> He's of the same opinion still,"

holds true with regard to the adolescent boy also.

A wise teacher will not decide upon the punishment to be administered to adolescents without first consulting with them and making them see the reason for its necessity and justice. One of the prime objects of discipline is to nourish in pupils the desire for self-control and to develop in them the power of ruling their own spirits and living up to their ideals. This cannot be accomplished by the imposition of authority without reference to the opinions of those controlled.

4. *Narrow-Mindedness.*—The intellect of the adolescent pounces upon a few things which it emphasizes unduly to the exclusion of others. As the root of the evil lies in the fact that his knowledge is so limited, the best remedy is to broaden his mind and increase his intellectual store by conversation, reading, or lectures given by persons holding different points of view.

Allied with this narrow-mindedness, we often find exclusiveness of association, and a devotion to the ideals of a group with but little thought of the outside world.

Social broadening, the meeting of people in various walks of life, of varying religious and political views, and if possible of different nationalities and races, is the best antidote for this. While a wide social acquaintance and foreign travel are not always possible, books are within the reach of all, and through them, the boy may be brought into touch with other minds and peoples.

A child should not be reared exclusively in the society of adults as was Eugenie Grandet in Balzac's novel. Neither should he be permitted to room constantly with a single companion in a boarding school. As the adolescent often learns more from those with whom he associates than he does from his teachers, the influence brought to bear upon him should be varied. If a boy envies a desire to be a member of a "gang" or other exclusive society, it is well to try to substitute for this an interest in an athletic society, the Y. M. C. A., or a literary society in which membership is open to all and the spirit is democratic.

5. *Credulity and Trustfulness.*—These are characteristics of early adolescence which it is desirable to preserve to some extent. So long as a thing will do a boy no positive injury it is best not to protect him continually from the results of his own acts, but rather to let him drive a bad bargain or in other ways take the consequences of his own credulity, in order that experience may teach him that all things are not what they seem. However, a teacher should discuss things with a boy and instruct him through the experiences of others. Sometimes, in later adolescence, the boy becomes skeptical and loses faith in God and in humanity. In such case, it does little good to argue with him. It is better for the teacher to put

before him solid truths, to keep him in touch with biographies of men of faith, such as Abraham Lincoln for example, and to show by her own life that she has faith. The pendulum will generally swing back again and the boy outgrow the pessimism of his adolescent days.

EMOTIONAL CHARACTERISTICS

1. *Fondness for the Opposite Sex.*—This trait should by all means be preserved and a parent or guardian should not take it too seriously and violently oppose the boy who falls blindly in love. Such a boy stands in need of counsel and he should be made to understand that the possibility of his marriage is yet a long way off. Every effort should be made to transfer this affection to the intellectual realm. When a boy sees that he is not opposed, he generally meets one half way. If he can be brought to look upon his fancy for a girl as "just a friendship," her companionship will often have a refining and elevating influence upon him. One hopeful thing about a boy of this age is that he is just as liable to fall in love with his teacher as with a girl of his own age, and this opens the way for a sensible, older woman to exert a lasting influence over him.

2. *Religious Ardor.*—Adolescence is the time of religious enthusiasm. Although a boy may have been reared in a religious atmosphere, the wonderful gospel truths now dawn upon him in their fulness and for the time overwhelm him, sometimes leading him to do things which older persons consider extreme. I have known of adolescent boys who attended as many as six services on Sunday and were to be found at the church nearly every evening in the week besides.

This is a critical time in the boy's religious life, and if his aspirations are now stifled, they may never again be awakened. Our Young People's Societies fill a great need here by furnishing opportunity for the young to meet together to formulate their beliefs, talk over their experiences, and encourage each other in striving after a better life. Through their pledges, they give the individual something definite to do for the nourishment of his spiritual nature, and through their missionary and social activities, he finds a practical outlet for his enthusiasm.

Under no consideration should a boy's religious enthusiasm be made a subject of jest. A few years ago, there lived in Berkeley a minister of the gospel who drove his two adolescent sons from the church and caused them to believe that there was nothing in religion, by ridiculing them for reading their Bibles on the ferry boat when crossing to San Francisco.

Having been laughed at before their church friends these sensitive boys sought other society and from that time began to lead aimless lives, one of them becoming addicted to the use of strong drink.

Some parents and heads of boarding schools make it a rule that the adolescent children under their guardianship shall attend the church with which they are connected, irrespective of the preferences of the young people themselves. As a result the latter often lose not only their enthusiasm but their interest in religion. If that which is best in the boy is to be brought out he should be permitted to attend a church where his spiritual hunger can be satisfied, irrespective of petty differences of form and creed.

3. *Sympathy and Charitableness.*—While it is desirable that these characteristics should be transferred from the realm of the emotional to that of the intellectual, great care should be exercised to prevent their becoming atrophied, and the heart of the adolescent hardened in the presence of poverty and suffering. When the sympathies are aroused, the achievement of some practical result by which matters are improved should be the end in view. There is evil in a course of moral lessons that overworks the sympathies, and care should be taken not to deaden the sympathies by the recital of woes that have no connection with the life of the boy. For example, constant and detailed accounts of the atrocities of the Turks in Armenia or of famine conditions in isolated parts of India or China where it is difficult to send food, should not be used to work upon the sympathies of an adolescent. An effort should rather be made to stimulate that kind of sympathy which is evoked by tales of heroism and loyal service.

4. *Sanguinity and Daring.*—A boy plunges into a thing without either counting the cost or considering the means. His own experience is limited and he is often unwilling to profit by that of others. In such cases opposition is vain, and the teacher or parent cannot do better than to lend herself to his scheme and try to help him work it out. She can then at least retain a guiding hand upon the rudder and steer him clear of many shoals. A short time ago I had an experience of this kind myself with a former pupil. He had set his heart upon giving up his position, borrowing money, entering into partnership with another young man whose inexperience equalled his own, and starting a business. After having told him that if I were in his place, I should not think of doing such a thing, and having seen that counsel would be wasted, I applied myself to helping him lay plans for fitting up the store. The array of figures that I was able to muster startled

him, and after he had thought it over for a few days, he advised his would-be partner that it would be better for them to keep on working for salaries for a time longer at least. The impractical scheme was thus abandoned. I am certain, however, that had I openly opposed him, he would have felt that I lacked confidence in his ability and judgment and would have failed to consult me further.

Sanguinity and daring are, however, qualities to be preserved as they often prove invaluable under circumstances demanding quick and unhesitating action. Moreover, the boy who " hitches his ladder to the stars " is a much more agreeable member of a household than one who is pessimistic and lacks the courage of venture. Our aim should therefore be to direct rather than to crush these characteristics.

5. *Irritability.*—The adolescent is often quick-tempered. He hates with intensity, and his desire for victory prevents his considering a situation calmly. One way to check this is to afford little occasion for its exercise. A teacher should try to avoid coming to an issue with a boy. Again, much depends upon the atmosphere, and if the teacher be herself calm, reasonable, and self-controlled, the boy is likely to keep his temper in check. It is frequently the case that a fiery-tempered boy becomes, through self-control, an even-tempered man. In such a case, old instincts have withered and new ones have taken their place. A boy may be educated to better self-control and more reasonable ways of looking at things by discussing with him stories of men who were patient under injustice and came out conquerors, and of others who acted in haste and repented at leisure. Illustrations may be found in the lives of persons about him which will convince him that it neither pays nor adds to his dignity to be quick-tempered.

6. *Selfishness.*—This is a common adolescent characteristic. The boy often desires to have the lion's share and to do that which suits his pleasure, irrespective of the rights of others. This selfishness is often the result of thoughtlessness. Sometimes it is a good thing to let a boy see himself as others see him, and to help him plan little acts of kindness and attention to others.

An instinct that may be called upon to do battle with selfishness is sympathy. The relation of a story of tyrannical conduct will cause the boy's mind to revolt against the unmanliness of the character of the tyrant and glow with sympathy for the victims. Interests outside of self should be developed and the achievement of some practical result aimed at. Some theory of social welfare and right relation of the individual to those about him should be formed.

7. *A Strong Sense of Personality.*—Under this heading may be grouped self-consciousness, a sense of honor, self-importance, and unwillingness to retreat from a position or to admit that one is wrong.

Knowing that adolescents are self-conscious and very sensitive, a teacher should be careful not to hurt their feelings by little sarcastic remarks, etc. Criticisms made in class should be general, and individual reproof should be given in private. It more often happens in the case of the adolescent boy than in that of the girl that self-consciousness makes it well-nigh impossible for him to stand and recite what he knows, especially if the other members of the class are permitted to act as critics and to " giggle." While in the lower grades it may aid in the concentration of attention to have pupils point out mistakes in a recitation, it is not good policy in the High School. In dealing with adolescents it is wiser to endeavor to improve the quality of recitations by commendation of those that are good than by criticism of those that are lacking. A word supplied by the teacher here and there will help the stammering tongue and aid the boy in overcoming his embarrassment.

Self-respect and a sense of honor are adolescent characteristics which must be fostered. Here again, the teacher's example is worth more than her precept. History, Literature, and Ethics may be used in helping the boy to formulate a standard of conduct. In ethical discussions some introspection may be good, but much subjective work is not to be recommended because of self-consciousness. It is a splendid thing for a teacher to put her boys upon their honor with regard to behavior and it is sometimes well to reprove them by merely saying, " You have forgotten yourself." The boy's conduct is then the result of an inner impulse, and discipline is not a match of wits between him and the teacher.

Self-importance, while a far more desirable characteristic than self-depreciation, should be toned down gradually by giving the boy more knowledge and by bringing before him the life-stories of the great. In his limited social group he has only his fellows with whom to compare himself, but as his horizon widens he is enabled to form a more rational estimate of himself. His self-confidence must, however, be retained even at the risk of his over-estimating his abilities.

Snobbishness is a most disagreeable form of self-importance and it devolves upon the teacher to use her best efforts to overcome this. I once taught in a Junior College for boys in which at the beginning of one semester this undemocratic spirit crept in like a serpent. Certain of the new-comers who belonged to well-to-do families looked down upon those who could not afford to dress so well as they. We teachers felt it imperative that this spirit be eradicated without delay. The president of the college fired the first gun by coming to school in a faded blue hunting jacket and by taking occasion to remark at the student body meeting that in his dealings with men, he had often noticed that those who lacked intellectual ability tried to make up for it by the wearing of fine clothes. He then made a humorous comparison of such men with the peacock who has a small head but displays numerous gorgeous tail-feathers. The teachers also wore plain clothes. The boys took up the thought and applied it, and the old feeling of comradeship and equality was re-established.

The sense of personality makes it more difficult for the adolescent than the adult to acknowledge that he is wrong. Knowing this to be a fact, the wise teacher will not force him to the point, but will try to influence him by example and give him time to come to a conclusion by himself. Even if he is not brave enough to acknowledge his error openly, he will doubtless feel a shudder of self-contempt which will act as a safe-guard against repetition.

The desire for victory should not be stimulated by pitting one individual against another in debate and in contests for prizes. Team work in both intellectual and athletic pursuits fosters a better spirit. When students can be brought to see that victory over self is more commendable than that over another, a step has been taken in the right direction. The atmosphere of the class-room has much to do with either the development or suppression of this trait.

Chinese tradition holds for us a beautiful story of the reign of the Emperor Wen Wong which illustrates the influence of the social atmosphere upon conduct. Wen Wong was noted for the wisdom with which he ruled his kingdom, and two of the princes of neighboring states having difficulty over their boundaries, decided to lay their quarrel before him. Upon entering his domain they were so impressed by the way in which his subjects yielded to each other and set the rights of others before their own, that before they had reached the capital, they had already settled their difficulty. They, therefore, returned home without seeing Wen Wong.

8. *Restiveness Under Authority.*—In the later years of adolescence, boys are often fractious and restive under authority. A boy of this type cannot be driven, but will do well if permitted to take the initiative. An outsider is generally able to exert more influence over such a boy than his immediate relatives. The Chinese would deal with such a case by filling the mind of the boy with the sayings of their philosophers

regarding the conduct of the "Superior Man" and by having some respected member of the clan (group of villages) talk with him in a friendly way. So great is the respect of the Chinese youth for his elders and so anxious is he to stand well in his clan that this often suffices.

However, in dealing with unruly American boys we have not these conditions to aid us, and the method pursued by the Japanese will perhaps throw more light on our problem. They send the unruly boy to live in the family of some friend, and the changed conditions usually bring about the desired results. In fact, the Japanese often exchange even those boys who are not difficult to get along with for the sake of the influence that is exerted upon them by living in the families of strangers. It is a common saying throughout Japan that a boy never becomes self-reliant until he has "eaten rice with strangers."

I have often known of American boys being sent to boarding schools or military academies with good results. A few years ago a widowed friend of mine who had an uncontrollable boy sent him East to her brother. After about a year he returned, a man in every sense of the word, and he has since been the mainstay of the family. We may therefore conclude that one effective method of dealing with a boy who is hard to manage is found in change of environment. By being placed among strangers who do not look after his comforts and cater to his whims as his mother has, he is thrown upon his own resources and forced to become more serious and self-reliant.

Summary.—The main points of this paper may be summarized as follows:

1. The object of discipline is to nourish in the adolescent the power of self-control.
2. Adolescents should be led by indirect methods and example, rather than forced.
3. Their minds should be filled with the good and pure, solid truths should be set before them, and sound instruction and timely warnings given them.
4. They should be held to some definite line of work or study.
5. They should be given opportunity to think, act, and gain experience for themselves.
6. Their religious enthusiasms and preferences should be respected.
7. A cordial relation should be maintained with them, and help afforded in the working out of their problems.

THE FACTORS OF MENTAL DEVELOPMENT, CONSIDERED FROM AN EDUCATIONAL STANDPOINT*

By W. H. Winch

Educational theory—an unprejudiced observer seems bound to confess—appears as a sort of see-saw through the ages; there is little continuity; but much assertion and counter-assertion.

So long as the life of communities is varied and changing; so long as the ideals of life itself are subject to change, so long must we expect a measure of dispute in the philosophy of education. But the bounds of the dispute may be made more definite, and the disputes themselves may be narrowed to clearer issues if scientific method be applied to the estimation of the facts, which the various schools of thought adduce in support of their respective ideals. Among the basal questions in educational theory are those broad issues which we may call the factors of mental development or growth. What are those factors? One is almost tempted to try to answer by a treatise *de omnibus rebus*. But obviously, capacity and time and space forbid. One can produce only an outline sketch. What is the present position? We have swung violently—in theory, at least—from a belief in the all-sufficing efficacy of environment, educational or otherwise: we have ceased to believe—in the nineteenth century sense—that man is a 'reasonable' being: we have frankly accepted instinct and impulse, conative tendencies rather than deliberate and considered volitions as our educational bases, and to some this anti-intellectualist trend in education seems to have overshot the mark. But there is one common ground for all educationists, of whatever school: they can write in the attempt to discover what the factors of mental development are, and how much each factor contributes to the effects desired. I do not intend to re-introduce you to a discussion of minute and difficult questions in psychological and biological terminology. As soon as one begins actual research in schools, we find it necessary to work with broader and more practical concepts, and in this the man of science and the teacher are at one. But they often diverge when there is an attempt made to estimate the value of their concepts quantitatively. Much if not most of the mental development which, as a body, teachers accept, without question, as the results of their training are probably due to another factor altogether, namely, that of *spontaneous growth*—the inner ripening of the organism without any form of external stimulation. As teachers say " The boy cannot learn, he hasn't got the brains." Thus they emphasize this factor of inner growth negatively. They are not so ready to accept it positively. They point to brilliant successes in college and in life as a result of their teaching, and are not so ready to argue that the boy succeeded because he *had* got the brains.

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First then, let us accept as one of our prime factors that of spontaneous growth or inner ripening. I suppose I ought to say how much is due to this factor, or to indicate how such an evaluation may be made. Well, at one time we were rather hopeful that such an estimate might be made if we worked from the structural or anatomical side. But the very progress of physiological psychology itself has weakened our hopes, and we now realize the necessity for approaching the question functionally. But here we are in a difficulty: we cannot isolate human beings from all environmental influences. There are extant stories of children who ran away from social influences early and who are said to have suffered much mental retardation. Doubtless they did lose much but their number is too small to yield us a valid statistical result, and no exact or even approximately exact knowledge exists as to the condition of these wild human specimens *before* they escaped. It might indeed be fairly argued that they were of very primitive type congenitally in order to want to do so. A comparative psychologist may invite us to turn for guidance to work on animals; which *can* be isolated in sufficient numbers to yield valid evidence. But would not educationists who accept conclusions drawn from the lower animals as applicable to the human animal lay themselves open to a severe and scarcely answerable rejoinder? Those who think more of environmental influences than of spontaneous growth in education might fairly say that the great difference between animals and man lies just there; the animal is instinct-driven, the man educable and reasonable. And though belief in the non-educability of instinct-driven animals does not stand where it did in the last century and though man, too, is now recognized as instinct-driven, the plea must be admitted as relatively correct. We are forced then to deal directly with the growing man. Herein lies one great justification for child-study investigations and pedagogical experiments, both of which have suffered from the shafts of ridicule aimed at them by the learned. But if we dislike the criticism we can still learn from it, and it behooves those of us who press forward the child-study movement to be cautious as well as progressive and not draw conclusions on slender evidence. We had best therefore say that we are unable quantitatively to estimate the strength of our first factor, for we cannot isolate the child—for experimental purposes—from all social environmental influences. But he can be brought up, and indeed, often is, without the direct pedagogical instruction of the school. Let us not, for one moment suppose that such a child is receiving no education. I do not speak now merely of the educative influences of the external material world, but of the social educative influences of his family and of his fellow children. This is, indeed, the second prime factor which I ask you to consider—the factor of *social environment* outside the school and apart from that of direct pedagogical instruction or training.

Fortunately a direct experimental method now becomes possible. We can, if we have an educational system elastic enough, measure the mental progress, accepting either psychological or pedagogical tests, of those who enter school early and of those who begin attendance at school later. I have endeavored to do this for young children in my monograph on *When Should a Child Begin School,* which is issued by Warwick and York, Baltimore, the publishers of the *Journal of Educational Psychology.* Suffice it to say that the inquiry was laborious and protracted, but the result a clear one. There is no scientific justification for any nation to spend much money and social service on the very early education of young children in school. We cannot say the more teaching the more progress. But if the school is not responsible for all the benefits that have been claimed for it, if our third prime factor—that of *pedagogical environment*—is not so productive of good as was once thought: neither probably, is it productive of so much evil as it is the fashion in some quarters, now-a-days, to assert. Eyesight is failing, is it due to learning to read? No evidence has been advanced based upon a method of *equal groups* to show that it is.

Though we cannot deal directly with our first factor in isolation and though the influences of our first and second factors are only with difficulty isolated from that of our third factor, the case is otherwise within the field of the third factor itself. Herein we can definitely experiment: we must abandon the method of guess-work, and teachers are entitled before being directed to adopt methods of teaching and learning, to ask for the evidence on which the directions are based. It is quite true that psychology itself has valuable suggestions to offer: but it is also quite true that it leaves the educationist too much in the dark. For instance: a good deal of measurement of mental functions has been done, yet some hold that mental development in one function has little influence on that of another—the mind, they say, is a congeries of more or less independent functions: others hold that the mind is a unity or at least consists of somewhat unified groups of functions, interrelated and interdependent. May I make one suggestion in passing. High numerical correlation between mental functions may not mean inner mental connection. It is possible for example, to improve accuracy in numerical computation without thereby improving arithmetical reasoning (two highly correlated functions), as I have endeavored to show in the *Journal of Educational Psychology*. I am not belittling numerical accuracy; our English schools are suffering from the lack of it, but let us obtain it, if at all, for its own sake, not for the sake of a mysterious faculty called accuracy which will forthwith spread to all branches of study. On the other hand it has been asserted that visual apprehension and memory cannot be trained. Personally I do not believe this and have presented experimental evidence in the *British Journal of Psychology* which appears to me to show that it can, *so far as children are concerned*. I have led you, I fear, into the thick of the disputed questions known as the 'Faculty Doctrine' and the doctrine of 'Transfer:' the way out lies through experiment with equal and correlated groups in the schools themselves. If I might venture to forecast a solution it would run somewhat thus. There will not be found enough transfer to justify a curriculum based upon it. The education of a 'scholar and a gentleman' will not suffice for everybody. But taught in certain ways, the things we need to know, both for 'life' and for 'college' will be found to have certain valuable transfer effects.

But we do not know yet. And precarious inference is often all that the educationist has to rely on. For instance, the same brain centre, it is said, operates language and mechanical dexterity: therefore it is argued, improve the one and you thereby improve the other. This may be true, but where is the evidence of transfer? I need not multiply instances: every educationist knows them.

And when one passes from these big issues to the minor ones of school method, the situation is scarcely bettered. We all agree that civilized children should be taught to read: but how? "Teach this way" says one authority, "No, that way," says another of equal eminence. The bewildered teacher—in England, at any rate—does find a way out—a very bad way. He sticks in practice to his old way, right or wrong, and lets the other ways do duty on special occasions, if the views of his inspector are known. But experiment *with* the teachers in their schools, and you will find alert criticism and eager help.

I am painfully aware of the inadequacy of this paper. I have presented you with a programme rather than a performance. There are only one or two scattered references to items of execution; but if I have succeeded in making clear how little I know either of the quantitative value of the great factors of mental development or of the results of the minor factors of training involved in school methods, the paper will not have been written in vain.

VISUALIZED OPPORTUNITY

By A. M. Boggs, M. A.
Assistant Director Bureau of Commercial Economics

The crying need of this age of materialistic specialization is opportunity. Ever have the great-minded men been seeking to make straight the crooked paths, to bring light into darkness. For the past fortune has chosen the few, selecting those whose forefathers she had favored and rarely seeking amidst the crowd for new recipients of her gifts. From the sweatshops and factory, from the farm laborers and railway gangs; from the grammar school pupils to the graduates of colleges and university, arises the cry, ever swelling as the flowing tide, "Give us opportunity."

The world has heard the cry and has sought to answer it with training schools and charities. That the boys and the girls as they enter the business world may be better equipped to compete, vocational schools have been instituted in which excellent training in a few specific subjects may be had. The high schools were the first to profit by the new departure in education. But the number of children, 23 per cent., that receive any training in the high schools[1] was too few to reach the heart of the situation. Industrial and vocational training, proving its efficacy by the few that had been fortunate to receive it, is now being introduced in the elementary grades. Boston, for example, has its "pre-vocational schools" and Philadelphia about forty-two such elementary vocational centers. But again only half of the school population received the benefit. The American Federation of Labor, in the annual convention in Rochester, November 19, 1912, urged "a greater interest in the education of the twenty-five million children of school age in the United States, 50 per cent. of whom leave school by the end of the Sixth Grade at approximately fourteen years of age."

The loss of 50 per cent. of the school population has been estimated by the National Association of Manufacturers in its meeting of May 21, 1912, to represent $250,000,000,000 of human resources[2] and to counterbalance the fearful waste of labor capital, the National Association of Manufacturers have founded and systematized corporation schools. They pledged themselves " to the development of a modern apprenticeship wherein by contract the respective and equal rights of employer and employee are fully recognized, the entire trade is taught, together with such other subjects as are essential to good citizenship.[3] They have likewise endorsed thoroughly the continuation schools. The continuation school is indigenous to the soil of Germany. It has been transplanted into the fertile ground of Wisconsin and Ohio and has grown under the new climatic condition, even more hardy than on its native heath.

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[1] Report Commissioner of Education, 1912, two volumes. Washington, 1913, Government Printing Office, p. 481.

[2] Minutes National Association of Manufacturers, May 21, 1912.

The fundament of the continuation school is, as its name suggests, a continuation of school work by those who through necessity or choice have entered the wage-earning world. The statute governing continuation schools requires the attendance of all employed children, in some instances until the age of sixteen, others eighteen years, for a specified number of hours throughout the week, which hours must all be done in and completed by daylight, and employers are required to pay their employees for the time thus consumed in school. The curriculum covers a wide field and iincludes cultural studies such as English Literature, French, German and Art. The whole idea is to give a more complete concept of life, a more fundamental philosophy of the art of living.

Continuation schools in the United States are, however, still in the experimental stage. The State of Wisconsin, under the able supervision of Mr. H. S. Miles, has perhaps made greater progress in this direction than any other part of the country. Teaching a trade as a whole balanced by cultural work will certainly make men and women approximate more and more the economic goal, a self-sufficing economic unit.

But there are still thousands and thousands of individuals who must be led to a situation, for whom no provision is made. The great army of the unemployed, the criminally employed, clamor for opportunity. Charity in the form of personal assistance is able to reach but a few. Is it not possible to find some preventative of pauperism rather than a palliative? The modern schools of medicine no longer endeavor to cure but strive to remove, eliminate, eradicate and prevent those conditions that are conducive to disease. Their efforts are concentrated on a healthy environment and a normal individual. So it must be in the industrial world. To prevent unemployment, begging and all the kindred evils that result from the present economic conditions, some note must be sounded which shall be the keynote of a new harmonic development that will permit every individual, man, woman and child, to react to his fullest capacity in a clean, healthy and normal atmosphere.

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[3] Idem.

"The greatest difficulty in American life is the inability of the man to discover before life is over his real work in the world." Thomas R. Marshall, Vice-president of the United States, has here touched the weak link of the industrial system, for the majority of the younger generations are forced through economic pressure, or through chance, to select the employment which is at hand, irrespective of their native penchant and ability. A young man, influenced by a desire to please his parents, studied engineering with considerable outlay of capital in money and time, only to discover that he is discontented and a failure; that his real vocation is secretarial work. Had he had an opportunity, when a boy, to see all forms of work, with their complicated details, had he been informed of each trade and profession, just what the difficulties were, he might have detected his real place in the world. As the Hon. Miles M. Poindexter, United States Senator from Washington, says: "To my mind one of the greatest educational problems of the day is fitting the boy to the job. Too many of our young men are being graduated from schools and colleges educated for a work they will never follow, because they are not suited to it and uneducated in the lines where they might have made a great success."

Maladjustment, patent on all sides, must be remedied. The economic waste is too great to be permitted to continue. "What is the panacea" is the problem that has agitated the mind of educators, masters of industry and of all interested in the welfare of society.

The task is not so stupendous as it appears; though it is not possible to house under one roof all the shops of the world, nor is it feasible to take every child to visit and study all the trades that he may make an intelligent selection of his vocation in life, yet it is possible to bring the form, the factory, the construction gang and the ocean liner to the boy through motion pictures. Cinematography is still in its incipiency; it has not yet discovered its richest view of usefulness—the living text book. Every variety of subject may be thrown on the screen except, perhaps, the speculative branches, as mathematics, logic and philosophy. Physical and social sciences are better taught through the eye than through the ear.

The most minute and delicate actions may be photographed;

no movement is too quick or too instantaneous that it cannot be recorded on the sensitized film. There are in existence films that depict the circulation of blood, the typhoid bacteria, delicate surgical operations, diseases of the nervous system, the effect of X-Rays upon the human body; the ionization of metallic compounds, the separation of gases by electrolysis and delicate chemical reactions. Historical subjects, as is well known, lend themselves admirably to dramatization, and what more graphic method is there of studying social conditions than living pictures of real slums in the cities of the world? Consider a moment the comparative possibilities of Cinematography, for Sociology, Geography, and change from book knowledge to practical experience; the broadening influence of world travel is attained, a remote barbaric village in Asia, in the New Hebrides, the actual conditions existent at the South Pole, the horrors of the present world war may all be brought before one's eyes and if these pictures are used to illustrate authoritative lectures and are so arranged that they follow a natural sequence, their value is inestimable.

Educational films abound but the films of opportunity are scarce. Films of opportunity are those which disclose to the observer some avenue of employment. The pictures do more than amuse and instruct; they are the medium by which the job can be brought to the boy. Through them the whole world of industry and commerce, of gainful employment, may be shown on the screen. Dr. Charles W. Eliot, the grand old man of education, has described it as "Doing on a great scale what Benjamin Franklin's father did for his son, who was deciding on the choice of a trade. The father took the boy about Boston and showed him work going on in as many trades as were then represented in the little town. It was only after having seen the work done in the various trades that Benjamin decided to be a printer.[4] A trade is taught as a whole and every detail viewed and reviewed until it is thoroughly mastered. Those actions that require niceness, exactness and delicate execution are enlarged and made visible by the aid of a microscope. A lesson in agriculture, for example, is concerned not only with the actual planting and harvesting of crops, but deals quite as much with geographical locations of soil adapted to any particular growth. Thus the thousands of men and women who are beyond the reach of compulsory education or of the continuation schools may be reached. The president of the Normal School of the City of New York, Dr. George S. Davis, commenting on the possibilities of this method of information, has declared, " The device for presenting to the people in the representative form of pictures, information concerning the elements of the various trades and occupations, seems to me to be most excellent and ought to be productive of much good. It ought to be most helpful in the solution of the problem of the unemployed. For the instruction will reveal to thousands the unsuspected avenues of effort and suggest to them things they can do. I can conceive of nothing more needful than this nor of a better method of accomplishing it."[5]

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[4] Letter of Commendation Bureau of Commercial Economics, p. 1.

The possibilities of moving pictures as a factor in the industrial equation had not until very recently been realized. Some of the larger corporations endeavored by lectures illustrated with slides and motographs to depict to the public the advantages of certain commodities. The International Harvester Co. has done more than any other corporation in this respect; their subjects illustrate the rise of agriculture, of commerce, of power. As a comparative study of ancient and modern methods these lectures are magnificent, but they are not opportunity films. In point of fact there has been no attempt to systematically arrange or present such reels of this type as are extant.

In November, 1913, an educational organization was perfected to make a detailed study of opportunity; to gather the films for this purpose which had already been made and to cause others to be made; to map out a series of studies and to present them to the public in a concise, succinct method, comprehensible to all. In planning these lectures, two principles were followed: To depict fully and accurately the industrial processes and to illustrate how things in common use are made and produced. The syllabus of lectures includes Mineral Resources; Agriculture, Horticulture, Forestry; Animal Industry; Industry; Commerce and Transportation; Domestic Economy; industrial Organic and Inorganic Chemistry; History, Science, Travel and Religion.

An industrial lecture can be made as attractive and interesting as a travelogue. As for example, *Cotton and its Products*. The lecture considers first the quality of soil suitable for cotton and the preparation necessary for a good yield; the pictures on the screen portray the plowing, planting, cultivation, blossoming, picking and hauling to the gin. Then the interior of the gin is shown where the cotton seeds and stalks are separated and each set aside for further operations. The cotton is baled and shipped to the cotton mills where it is corded and spun either into yarn, and fabrics such as musclin, calico and gingham, and further made into wearing apparel; or is made into batting and absorbent cotton, or manufactured into nitro-cellulose, explosives, *i. e.*, guncotton and celluloid, or woven into artificial silk. Following the seeds, after their reception at the cotton oil mills, they are cleaned, reginned and hulled. The meats are crushed, then cooked and formed into cakes from which the oil is expressed. The oil passes through several purifying and refining processes before it is available as oleo-stearin, oleo-oil, neutral lard, oleomargarine, lard compounds, lard stearins, and soap. The cake, that dry residue kept from the expression, is used as fodder and fertilizer. The hulls in their turn are bleached, ground and bolted and become meal bran, fodder, paper-stock and fertilizer. The stalk of the cotton plant is useful for paper making and basket fibre.

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[5] Letter of Commendation Bureau of Commercial Economics, p. 5.

These lectures are not entirely pictorial. To accompany each one is a written, expert explanation which has been prepared by the best authorities in this country on the subject. As an instance, those dealing with organic and inorganic chemistry in industry have been written by the renowned chemist, Dr. Samuel P. Sadtler, who is also making experiments relative to the possibilities of microscopic cinematography in portraying chemical reactions.

To compete with the former method of instruction the motograph text books should be viewed and reviewed and the printed lectures, that have been placed on file in places accessible to the public, should be studied diligently. Visualization from the psychological viewpoint seems to make a deeper imprint on the brain than a printed page. The association centres react with greater alacrity and create a deeper channel through which memory flows more readily. The man, however, who is viewing the films to find something which he is capable of doing, will not, of course, pursue the subject with the same tenacity and concentration as he who is studying a trade.

The second principle involved in the presentation of these industrial films is to show how things in common use are made and produced. Strange, is it not, that scarcely more than one person in a hundred knows that his old kid gloves are made into glue? What is the source of chloroform? The lay mind is blank. It is certainly as important to know the origin of everyday articles as it is for the average person to know that the square described on the hypothenuse of a right triangle is equal to the sum of the square of the other two legs. Geometry is taught with assiduity, practical knowledge rarely.

"There are plainly great possibilities in the plan as outlined and it will have very great educational value. One of our great defects is our lack of details about industrial subjects. A glance at the list will convince most people there are many things they do not know and which are among the simpler items which make up our present commerce,"[6] says Dr. E. B. Craighead, President of the University of Montana.

The organization which has planned this pioneer educational work, as Dr. Eliot has described it, is the Bureau of Commercial Economics, of Philadelphia, which is founded on a philanthropic basis upon the recommendation of the leading educators and masters of industry of the country to engage in the free dissemination of industrial and vocational information by means of the cinematograph, showing graphically how things in common use are made and produced. It is an association of the leading institutions, manufacturers, producers and transportation lines in the United States and abroad, and is maintained through endowment funds and annuities. The Bureau, which was established in 1913, has gathered from various sources films and slides of agricultural, industrial and commercial interest and has arranged them into courses of study which are to be given in the thirty-four universities and colleges co-operating in the movement; the Bureau has been affiliated with several of these universities and has a student body of over 60,000. When the income of the organization is sufficient to warrant the expense, for no remuneration is accepted from the donors of the pictures for their display or from the institutions receiving them, the work will be extended to the high schools, public institutions, settlement houses, missions, commercial clubs and trade conventions. It is anticipated during the summer to have powerful projectors operated from auto trucks for service in the parks and playgrounds and agricultural districts. In this department the simpler industrial processes will be exhibited as the making of shoes, amply explained by concise headings throughout the films. A man, without employment, may perhaps see one bench at which he can work or can learn to work and then with confidence he enters the factory doors marked *"No Admittance Except on Business,"* for he knows just what he is capable of doing.

The bureau expects to develop extensively a plan to improve the material condition of the negroes of the South who, by force of circumstances and poverty, have grown to man's estate wholly illiterate. Of these there are great numbers and in communities where no funds are available to enlighten the inhabitants. Still and motion pictures will be shown liberally in the open to these people, depicting the methods used in clearing land, planting and harvesting of the crops indigeneous to the soil of the locality. In the first instance illustrating how it is possible to start without capital, using improvised equipment, and then gradually substituting more modern methods. The use of fertilizers and other safeguards to develop and to protect crops will be advocated. Lastly the negroes will be instructed how to put their truck in commercial packages of standard sizes and the facilities for shipment to the markets of the world. The thought being to initiate effort and industry by portraying graphically the results of such effort.

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[6] Letter of Commendation Bureau of Commercial Economics, p. 6.

The illiterates of the back country of the United States, whether black or white, are in desperate need of some sort of economic instruction. The rural schools are by no means adequate to the situation and the use of motion pictures in those districts which are devoid even of a country school house will undoubtedly put these people on a higher economic and cultural plane.

An experimental school for research work is being established to determine the actual value of pictures as a means of education. Eight children, all boys, are being gathered together from the illiterates. They are all about the same age and have had no previous educational training. They will be taught entirely by photography with the exception of those subjects which do not lend themselves to depiction. It is not, however, the intention of those engaged in this work to underestimate the value of books; literature of every type will be supplied to the children as they develop, through photographs, living and still, a capacity to grasp, understand, enjoy and appreciate the things that are more excellent.

A large house in the country in the vicinity of Philadelphia is being obtained in which the children will be lodged and taught. As they enter they wlll be examined physically and mentally and an accurate record kept of their accomplishment. They are to be fitted for the industrial world and their education, while balanced by cultural training, will nevertheless aim at an economic goal.

Although the Bureau of Commercial Economics is but ten months old, it has already received application from more than a thousand institutions for all of its lectures. The value of motion pictures is being recognized more and more as an educational factor and particularly in vocational training. In this field its importance cannot be overestimated, for it enables a man to choose his particular vocation without losing valuable time in the old-fashioned trial and error method of selection. The Bureau of Commercial Economics aims at one goal only: to give without expense to the public Visualized Opportunity and to fit the job to the boy.

FIVE HUNDRED FORTY-SEVEN WHITE AND TWO HUNDRED SIXTY-EIGHT INDIAN CHILDREN TESTED BY THE BINET-SIMON TESTS

By E. C. Rowe

In January and February of 1912 the writer directed the work of giving the Binet-Simon tests to 235 children in the lower grades of the State Normal Training School and in one of the ward schools of Mount Pleasant, Michigan. With this group the 1908 scale was used. In January and February, 1914, the tests were again given by the same persons working under the same conditions *with the exception that the* 1911 *scale was used.* Immediately after finishing with this second group the 1911 tests were given by the same persons to 268 children of Indian descent in the United States Government School located at Mount Pleasant, Mich. All of these tests were given by Helen Niles Rowe and the writer. With both the 1908 and 1911 editions Goddard's directions were rigidly followed. Each child was tested alone. No time limit was observed. It was found that kindergarten children could be tested, on the average, in about fifteen minutes while fourth and fifth grade children required from twenty-five to forty-five minutes each. The pictures and weights used were obtained from the C. H. Stoelting Co. of Chicago. The child's age was determined by his nearest birthday. In using the 1908 edition the child's mental age was determined by the highest age for which he succeeded in all the tests save one. In the 1911 tests it was determined by the highest age for which the child succeeded *in all the tests.* In each case the child was advanced one year for each five questions answered correctly beyond the year for which he answered all the questions (1911 ed.) or all save one (1908 ed.).

Comparison of the results obtained with the 1908 edition with those obtained with the 1911 edition does not show any marked differences so far as the general results are concerned. If Binet, Bobertag, Goddard and others are correct in assuming that about fifty per cent should test at age, the general results obtained with both editions indicate that the tests for the years from five to nine inclusive are not difficult enough (Cf. Table VI). However, it seems highly probable that if the tests for these years were made difficult enough to increase the number passing at age to fifty per cent, more than twenty-five per cent would fall below age. This raises the question of the distribution of ability. Binet seems to assume that the ability of children in general is distributed according to the curve of chance and that therefore the number of retarded should equal the number of advanced children. This assumption has gained widespread credence and in most of the discussions of the Binet-Simon tests is openly held or implied. The writer does not believe the problem is as simple as this assumption would make it. The eugenic studies of the size of families in the different social strata and the studies of retardation in the public schools would indicate that ability is distributed according to a curve skewed toward the side of inferior ability.

Terman and others have obtained results with the Binet-Simon tests showing that the distribution of ability for the younger ages is skewed toward the side of superior ability and for the older ages toward the side of inferior ability. The usual explanation of this difference is that the tests for the early years are too easy and for the later years too difficult. However important this explanation may be there are at least two additional explanations. The first is, that the school and other educational agencies appeal more forcibly to the younger children; that the tests measure acquisition and language ability as well as native intellectual capacity—hence the skewed distribution. The second explanation is that the same functions are not measured by the tests for the early and later years; that the rate of development varies with different functions and that therefore, different functions are differently distributed in different ages. If, as has been suggested recently, mental normality means a *certain rate of development,* further analysis may show that this normal rate varies with functions as well as with individuals. Consequently it is highly important that a series of tests measure the same functions in order that results be comparable and reliable.

Probably nothing is more needed to further the development of reliable tests and standards of general intelligence than a comprehensive study of the distribution of specific abilities by ages for each sex and possibility for each nationality and for different social conditions. This would necessitate the careful testing of a large number of children of each age, sex, and nationality. The importance of the nationality factor is strongly suggested by the results of this study.

Attention is here called to the fact that in all those tests involving a time limit the Indian children were allowed a longer time than that given by Goddard in the edition of 1911. This was done to avoid the possible criticism that the Indian's reaction time is naturally slower and that this difference in reaction time is the main difference in the two races. The Indian *is* unquestionably slower than the white child; but he differs from the white not only in terms of " readinesses " but in terms of " bonds "[1] as well. The striking difference between the Indians and the two groups of white children cannot be explained by hygienic, social and educational differences. Probably every child in the Indian school was born in a rural community where food is abundant and more easily obtained than in urban communities and where the child leads an outdoor and more nearly natural life. Moreover, many of the children examined had spent three or more years at the government school where good food is plenteous and the school conditions at least average. The children go to school one half day and work the other. The half day of work is also educational in that each child is taught some trade or occupation. It seems therefore that the only satisfactory explanation of their inferiority in terms of the tests is to be found in an inferiority of native ability.

In connection with these results attention may be called to the results obtained by Stone with reference to the influence of social and home conditions in the determination of sixth grade ability in arithmetic. Attention is also called to the fact that the difference between the Indians and whites is much greater than the difference between the white and colored children tested by Morse and Strong.

When it is recalled that these Indian children average much older than the white children with whom they are compared and that the overlapping of the two groups is only slight, it seems clear that the type of education suited to the one is not suited to the other. This position is supported not only by the large quantitative differences, but also by the less evident but real qualitative differences brought out by comparing Table IV with Table V. Such a comparison tends to show that the Indians are relatively weaker in tests involving comprehension and definition than in tests of a more purely perceptual or memory nature. The difference is not however as great as the writer anticipated and tends to support the view that there is a rather high correlation between the various abilities. The Indians are everywhere inferior to the whites.

A single comparison will serve to show that, with the present method of scoring, the tests are not always to be relied upon for accurate data. Two white children from the second grade, a boy and a girl, each seven years old, tested up to nine years mentally. Both passed all of the tests for the eighth year. Of the nine year tests the boy failed on the following: (1) making change, (3) date and (4) months of the year. He succeeded in (2) definition better than use and (5) arranging the weights correctly. The girl failed in the (1), (2) and (3), but passed (4) and (5). Under the ten year old tests the boy failed (3) to repeat the figures, did not (4) comprehend the "-what-ought-one-do" questions, and failed (5) to make a sentence containing the three given words. The girl however passed all the ten year old tests except the (5). Under the eleven year old tests the boy failed in all but the rhymes whereas the girl gave the rhymes *and also the absurdities,* doubtless the most severe of the eleven year old tests. The girl therefore passed eight tests beyond the year for which she passed all, while the boy barely passed the necessary five to get credit for an additional year beyond the year for which he passed all. Moreover the girl passed certain tests—the comprehension tests of the tenth year—which the boy probably cannot pass in six months or a year. The girl is in the best third of the grade, the boy in the poorest third. In order to get further data on these two children they were given three additional tests and a 'comprehension' test based upon the "alternative questions" given by Goddard in the 1911 edition. In the logical memory test the boy made a score of fourteen, the girl of twenty-six. In the opposites, the boy scored forty, the girl sixty per cent. In the comprehension questions the boy answered three and the girl ten out of thirteen. However, technically according to the accredited method of scoring both should be given the same mental age!

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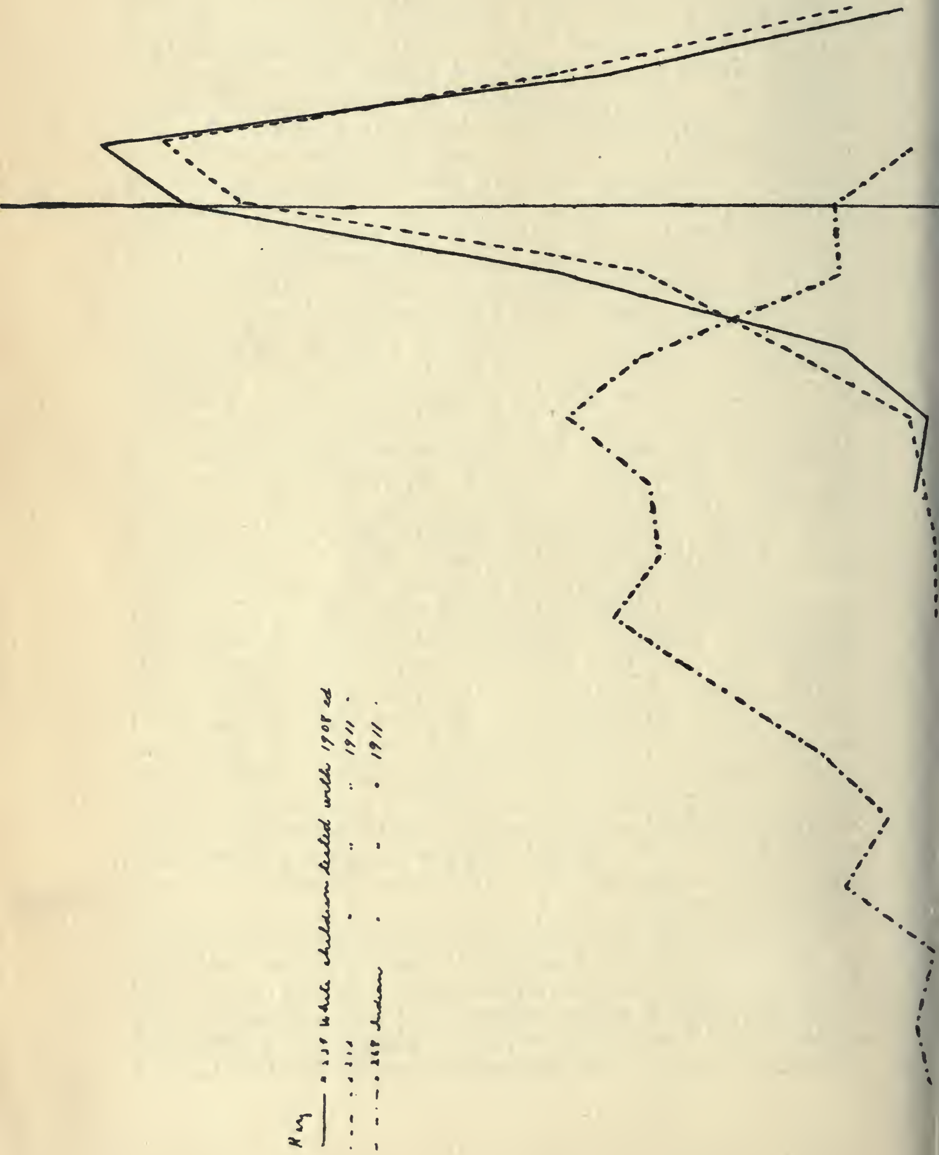
[1] Cf. Thorndike; Educational Psychology, Vol. II, p. 192.

This apparent coarseness of the scale which fails to bring out important differences is partly due to the scale itself but even more to the rough method of scoring. Of course no scale will apply itself; skill in interpretation is always necessary. But the present method with the year as the unit for expressing mental age and with its large latitude for interpretation and the "personal equation" can never bring anything like the exactness now obtainable with other tests and methods of scoring.

But in spite of the coarseness the tests are unquestionably of practical service. They have repeatedly been found to be more reliable in arranging a group of children in order of general merit than the judgments of their teachers. They should be of very great service in effecting a classification of children, such as the Indians whose classification must be


Key
—— = 339 white children tested with 1908 ed
- - - = 314 " " " " 1911 "
-·-·- = 269 Indian " " " 1911 "

made when entering the government school without reliable records of previous accomplishments. They should also be of service in determining the fitness for promotion of children in the public schools, especially when native mental growth is taken into account, as it should be, in determining the child's qualification to do the work of the next grade.

The details of this study are expressed in the following tables:

TABLE I

SHOWING DISTRIBUTION BY AGES AND GRADES FOR 235 WHITE CHILDREN TESTED WITH THE 1908 ED.

	Total No.	Below Age								At Age						Above Age				Ave.	Ave.	Ave.	Ave.		
		4 yr.	%	3 yrs.	%	2 yrs.	%	1 yr.	%	Total	%	Age	%	1 yr.	%	2 yrs.	%	3 yrs.	%	Total	%	Age	Dev.	Ment. Age	Ment. Dev.
Kindergarten.	61	0	0	0	0	0	0	4	6.5	4	6.5	24	39.3	27	44.2	6	9.7	0	0	33	54	5.18	.54	5.75	.54
1st Grade.....	53	0	0	0	0	5	9.4	9	17	14	26	21	40	14	26	3	5.6	1	1.8	18	34	6.75	.8	6.8	.87
2nd Grade....	54	2	3.7	2	3.7	2	3.7	4	7.5	10	17.8	12	22	18	33	12	22	2	3.7	32	60	7.75	.78	8.2	.78
3rd Grade. ...	33	0	0	0	0	3	9	7	21	10	30	4	12	14	42	5	15	0	0	19	58	9.1	.82	9.3	.66
4th Grade. ...	34	1	3	0	0	0	0	3	8.8	4	12	12	35	10	32	7	21	1	3	18	53	10.3	.93	10.9	.41
Total.......	235	3	1.2	2	.8	10	4.2	27	11.4	42	17.9	73	31	83	35	33	14	4	1.6	120	51	.....	.....	......	......

TABLE II

SHOWING DISTRIBUTION BY AGES AND GRADES FOR 312 WHITE CHILDREN TESTED WITH THE 1911 ED.

		Below Age									At Age			Above Age						Ave.	Ave.	Ave.		Ave.	
	Total No.	4 yrs.	%	3 yrs.	%	2 yrs.	%	1 yr.	%	Total	%	Age	%	1 yr.	%	2 yrs.	%	3 yrs.	%	Total	%	Age	Dev.	Ment. Age	Ment. Dev.
Kindergarten...	48	0	0	0	0	0	0	4	8.2	4	8.2	11	22.9	24	50	9	18.7	0	0	33	68.7	5.15	.49	5.9	.56
1st Grade......	66	0	0	0	0	4	6	6	9	10	15.1	20	30	26	39	8	12	1	1.6	36	54.5	6.7	.77	7	.45
2nd Grade.....	72	1	1.4	0	0	4	5.5	9	12.5	14	19.4	27	37.5	20	27.5	8	11	3	4.2	31	43	8.05	.8	8.3	.57
3rd Grade.	35	0	0	1	3	3	8.5	4	12	8	23	3	8.5	8	23	12	34	2	6	24	68.5	8.7	1.03	9.3	.76
4th Grade	63	5 y.1 6 yr.1 2	3.1	4	6.2	5	8	11	17	24	39	17	27	12	18.6	7	11	3	4.6	22	34	10.2	1.1	9.85	.58
5th Grade.	28	0	0	0	0	3	8.5	2	7	5	18	9	32	9	32	3	3	2	7	14	50	10.9	.6	11.1	.33
Total........	312	3	.9	5	1.6	19	6	36	11.5	65	20.8	87	27.8	99	31.7	47	15	11	3.5	160	52	.....	.....	......	......

TABLE III

Showing Distribution by Ages and Grades for 268 Indian Children Tested With the 1911 Ed.

	Total No.	Below Age																
		14 yrs.	%	12 yrs.	%	11 yrs.	%	10 yrs.	%	9 yrs.	%	8 yrs.	%	7 yrs.	%	6 yrs.	%	5 yrs.	%	4 yrs.
Kindergarten	26	0	0	0	0	0	0	0	0	0	0	0	0	2	8	6	24	1	4	2
1st Grade	38	0	0	0	0	0	0	1	2.6	1	2.6	1	2.6	6	16	2	5	5	13	2
2nd Grade	58	1	1.7	1	1.7	0	0	1	1.7	2	3	2	3	5	8.5	5	8.5	7	12	12
3rd Grade	49	0	0	0	0	0	0	0	0	2	4	3	6	1	2	6	12	9	18	9
4th Grade	28	0	0	0	0	0	0	1	3.6	1	3.6	2	7	1	3.6	3	11	2	7	2
5th Grade	17	0	0	1	5.8	0	0	0	0	0	0	0	0	2	12	4	23	3	18	3
6th Grade	17	0	0	0	0	0	0	2	1.2	0	0	3	18	2	12	6	35	1	5.8	1
7th Grade	22	0	0	1	4.5	1	4.5	5	24.5	0	0	2	9	3	13.5	3	13.5	3	13.5	1
8th Grade	4	0	0	0	0	0	0	0	0	0	0	0	0	3	7.5	1	25	0	0	0
Total	259	1	.4	3	1.2	1	.4	10	4	6	2.3	13	5	25	9.9	36	13.8	31	11.9	32
Number Testing above 12 years	9																			

									At Age			Above Age				Ave. Age	Ave. Dev.	Ave. Ment. Age	Ave. Ment. Dev.
	%	3 yrs.	%	2 yrs.	%	1 yr.	%	Total	%	Age	%	1 yr.	%	Total	%				
Kindergarten..........	8	5	20	5	20	1	4	22	84	2	8	2	8	2	8	10.2	1.6	6.8	.9
1st Grade............	5	8	20	6	16	3	7.9	35	92	3	7.9	0	0	0	0	12.18	2	8.18	.74
2nd Grade...........	20	11	18.7	9	15	1	1.7	57	98.3	1	1.7	0	0	0	0	13.3	1.8	8.62	.53
3rd Grade............	18	9	18	6	12	2	4	47	96	1	2	1	2	1	2	13.8	13	9.57	.74
4th Grade............	7	5	18	3	11	3	11	23	82	5	18	0	0	0	0	14.9	1.8	11.25	.95
5th Grade............	18	1	5.8	2	12	1	5.8	17	100	0	0	0	0	0	0	15.7	1.6	10.7	.51
6th Grade............	5.8	1	5.8	0	0	1	5.8	17	100	0	0	0	0	0	0	17	1.3	10.8	.97
7th Grade............	4.5	2	9	1	4.5	0	0	22	100	0	0	0	0	0	0	18.3	1.8	11.18	.9
8th Grade............	0	0	0	0	0	0	0	4	100	0	0	0	0	0	0	18	0	11.25	.37
Total..............	12.3	42	16.2	32	12.3	12	4.6	244	94.2	12	4.6	3	1	3	1	.....	.....	......	......

TABLE IV

Showing the Percentage of Correct Answers for any Particular Age for 312 White Children Tested With the 1911 Ed.

AGE	No.	IV				V					VI					VII					VIII					IX				
		1	2	3	4	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
4............	6	100	100	83	67	67	100	83	83	50	33	50	67	33	67	50	0	17	33	83	...	...	...	...	...	...	...	...	...	...
5............	34	...	...	...	...	94	85	94	91	85	88	85	85	56	91	65	55	67	38	97	29	3	18	3	24	...	...	...	...	...
6............	33	...	...	...	...	100	100	100	97	85	97	85	91	88	100	88	73	85	73	100	64	9	45	24	48	...	...	...	...	...
7............	59	...	...	...	...	...	...	...	...	...	100	91	97	91	98	97	95	88	91	97	90	35	73	52	81	12	36	22	30	40
8............	55	...	...	...	...	...	...	...	...	...	...	...	...	...	...	98	93	91	96	96	93	58	93	67	82	33	56	56	55	60
9............	45	...	...	...	...	...	...	...	...	...	...	...	...	...	...	98	98	100	98	100	87	71	82	73	82	51	60	62	64	73
10............	33	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	100	94	100	91	97	85	94	94	94	91
11............	29	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	97	100	97	93	86	86	90	90	90	76
12............	9	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	78	67	56	67	56
13............	7	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	100	86	100	100	86	57	71	57	43	71
14............	0	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
15............	2	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	50	100	100	50	100
		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	84	61	78	67	76	56	71	67	61	71

AGE	No.	X					XI					XII					XV					Adult				
		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
4......	6	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
5......	34	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
6......	33	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
7......	59	40	20	17	8	10	5	8	0	25	0	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
8......	55	60	29	27	25	27	20	25	12	37	24	0	2	0	0	2	....	....	....	....	....	....	....	....	....	....
9......	45	80	47	44	38	49	47	51	18	56	36	9	4	0	18	7	4	9	0	16	....	7	0	0	0	0
10......	33	100	82	61	67	79	64	79	33	70	55	21	12	3	24	15	3	9	0	9	....	0	0	0	0	0
11......	29	100	69	66	72	86	72	79	38	79	66	31	21	14	55	24	17	35	7	42	....	21	0	3	7	3
12......	9	89	22	44	78	78	89	78	56	56	33	22	11	0	56	22	0	22	0	33	....	33	0	0	0	0
13......	7	100	100	29	71	71	71	71	29	43	43	0	0	0	29	15	0	15	0	43	....	0	0	0	0	0
14......	0	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
15......	2	100	100	0	0	50	50	50	0	100	0	0	0	0	0	50	0	0	0	0	....	0	0	0	0	0
		83	73	36	45	56	52	55	23	42	32	13	8	3	30	22	....	....	....	....	....	....	....	....	....	....

TABLE V

Showing the Percentage of Correct Answers for any Particular Age for 268 Indian Children Tested With the 1911 Ed.

AGE	No.	IV				V					VI					VII					VIII					IX				
		1	2	3	4	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
6...........	1	100	100	100	100	100	100	100	100	100	100	0	100	100	100	100	0	0	0	0	0	0	0	0	0	...	...	...	...	...
7...........	2	...	...	...	...	100	100	100	100	100	100	50	100	100	50	100	100	100	100	100	100	100	100	0	0	0	50	0	0	5
8...........	4	...	...	...	...	...	...	...	...	...	100	75	75	100	100	75	25	75	0	50	0	0	0	50	75	0	0	0	0	0
9...........	8	...	...	...	...	...	...	...	...	...	87	100	100	100	87	100	62	100	100	87	75	81	81	50	75	25	50	25	87	100
10...........	16	...	...	...	...	...	...	...	...	...	94	100	100	100	100	100	94	100	100	90	56	90	75	56	75	19	38	31	59	70
11...........	20	100	95	100	95	90	100	95	100	95	100	85	90	90	90	90	85	85	95	85	75	75,	80	70	65	10	45	25	35	85
12...........	29	...	...	...	...	100	100	97	100	100	86	83	90	86	83	79	72	79	79	76	55	69	72	55	66	38	66	72	79	86
13...........	41	...	...	...	...	...	...	...	...	...	...	...	...	...	...	100	100	100	98	100	78	88	90	80	85	46	71	78	75	83
14...........	34	...	...	...	...	...	...	...	...	...	...	...	...	...	...	100	97	100	100	100	76	94	91	85	73	70	85	91	85	94
15...........	24	...	...	...	...	100	100	96	100	100	100	100	100	100	100	100	96	96	100	100	79	100	100	96	88	75	83	96	96	100
16...........	28	...	...	...	...	...	...	...	...	...	100	100	96	100	100	100	100	100	100	96	75	82	82	79	79	74	71	79	79	86
17...........	18	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	61	61	67	67	67
18...........	21	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	90	90	95	95	95
19...........	12	...	...	...	...	...	...	...	...	...	...	...	...	...	...	100	100	100	92	100	92	92	100	83	83	42	67	100	92	83
20...........	5	80	100	80	100	100	80	80	100	100	80	80	80	100	100	100	100	80	80	100	80	80	100	80	80	80	60	80	80	80
21...........	4	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	75	75	100	100	100
22...........	1	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...
		...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	...	74	82	88	64	71	57	72	74	84	99

AGE	No.	X					XI					XII					XV					Adult				
		1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5	1	2	3	4	5
6......	1	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
7......	2	0	0	0	0	0	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
8......	4	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
9......	8	62	62	12	0	0	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
10......	16	0	0	0	0	0	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
11......	20	80	55	10	5	5	10	5	5	5	5	....	....	....	....	....	....	....	....	....	....	....	....	....	....	....
12......	29	83	76	28	24	17	21	14	7	17	7	7	3	0	28	10	11	10	0	14	....	7	0	0	0	0
13......	41	83	66	36	32	29	19	17	0	15	24	12	0	10	17	10	10	15	0	17	....	5	0	0	2	0
14......	34	94	79	47	47	32	35	27	21	42	39	9	6	6	42	18	18	24	0	24	....	12	6	0	9	0
15......	24	100	88	58	58	54	50	50	29	37	54	21	4	12	42	17	25	12	0	42	....	8	0	0	4	0
16......	28	90	82	74	50	54	50	50	36	43	53	28	18	21	32	39	25	18	7	36	....	21	0	0	14	0
17......	18	67	67	56	56	50	44	50	33	38	44	22	17	17	17	22	17	11	5	28	....	5	0	0	0	0
18......	21	95	85	85	70	70	65	55	45	65	65	60	29	40	60	33	33	29	0	16	....	14	0	0	0	0
19......	12	100	83	50	58	50	42	50	25	33	42	17	8	0	50	25	8	25	8	17	....	0	0	0	0	0
20......	5	80	80	40	80	80	60	60	60	40	40	0	20	0	40	40	40	40	0	40	....	0	0	0	20	0
21......	4	75	100	75	70	75	50	50	0	25	50	25	0	0	25	50	0	0	0	20	....	0	0	0	0	0
22......	1	....	....	....	....	....	0	100	100	0	0	100	0	100	100	100	....	....	....	....	....	....	....	....	....	....
		85	78	51	50	47	37	44	30	30	35	27	9	18	41	33	....	....	....	....	....	....	....	....	....	....

TABLE VI

Showing the Mental Distribution and the Percentage Testing at and Above Age for Each Chronological Age

	5 yr. Olds		6 yr. Olds		7 yr. Olds		8 yr. Olds		9 yr. Olds		10 yr. Olds	
	1911 ed.	1908 ed.	1911	1908	1911	1908	1911	1908	1911	1908	1911	1908
Below 2 yrs.	0	0	0	0	0	2	1	4	3	2	1	1-3 yrs. below 0
" 1 yr.	0	1	4	5	3	5	7	4	6	7	8	5
At age.	5	11	6	22	21	12	20	11	13	6	12	6
Above 1 yr.	20	13	18	17	21	8	11	15	15	8	10	7
" 2 yrs.	9	3	5	4	9	5	13	8	6	7	2	1
" 3 yrs.	0	0	0	2	5	0	3	1	2	1	0	0
Total.	34	28	33	50	59	32	55	43	45	31	33	20
Percentage testing at age and above.	100	96	87.8	90	95	78	85	81	80	71	73	70
Ave. mental age.	6.1	5.6	6.7	6.5	7.8	7.3	8.67	8.5	9.46	9.45	10.1	10.05

THE PSYCHOLOGY OF PLAY*

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Several causes have suddenly revived our interest in the psychology of play. One of these is the rapid extension of the play-ground movement. A new art has come into being,—the art of directing the play of children. A new profession has appeared,—that of play-leader, employing already more than 6,000 people in the United States.

Another cause is the amusement craze, which seems to be sweeping the country. Its most virulent form is seen in the dancing mania, which has passed through various stages in America. Next to this in psychological interest is the moving-picture craze, which has seized the world like an obsession. Motoring, again, as a form of amusement, still holds the interest of a very large number and aviation is to some extent practiced or witnessed as a pastime. Just as we thought the world was getting very serious and settling down to work and to problems of social and individual welfare and to political and moral reform, it has suddenly gone amusement mad in America and reverted with unparalleled ferocity to primeval bloodshed in Europe.

This increased desire or need for some form of relaxation is not confined to the wealthy or the idle. It seems to be a widespread social phenomenon. For instance, a correspondent in a small mining camp near the Mexican border writes that the Mexican laborers, who comprise six-sevenths of the population, are strictly amusement mad, spending their last pennies at the movies or the merry-go-round or for intoxicants.

It is possible that the same causes which are operating in this increased demand for relaxation are responsible to some extent for the increased demand for narcotics. Statistics of the last fifty years in nearly all civilized countries show a very remarkable per capita increase in the consumption of tobacco and alcohol, the latter in countries where the rapid extension of " dry " territory would lead us to expect the opposite. The further rapid increase in the use of cocaine and other narcotic drugs, particularly in places where alcohol is not obtainable, strengthens the belief that there are conditions present in modern society which are intensifying the demand for some kind of release from some form of tension.

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* A more popular statement of the theory of play and sport offered in this paper appeared in the *Popular Science Monthly* June, 1914, under the title, The Psychology of Relaxation. One or two paragraphs from the former paper have been used in this.

No doubt we have here material for a sociological study of great importance but it is the psychological aspect of the problem which I wish to discuss in this paper. Our psychology of play needs revision. The play of children must be more closely correlated with the play of adults and both must be studied in relation to the more general subject of recreation or relaxation. The three principal theories of play thus far proposed, the Schiller-Spencer theory, the Groos theory, and the recapitulation theory, are confessedly unsatisfactory and incomplete. They are all partial views, not necessarily inconsistent with one another, and they all fail to correlate children's play with adult sport or even neglect the latter entirely.

The Schiller-Spencer theory, that play is due to overflowing energy, is based upon the serious error, as I think Professor Dewey has suggested, of assuming that quiescence is the normal state of the child or man. It is as if one should say that under normal conditions the child or the man rests or works and that when energy accumulates or superabounds then he plays. Truer it would be to say that the child or man is a playing animal and that on those rare occasions when he has to, then he works.

According to the Groos theory of play the plays of animals and children are instincts, which have arisen through the action of natural selection because of their usefulness as a practice and preparation for life's later serious duties. Professor Groos has written two voluminous books on the play of animals and the play of man containing a wealth of material on these subjects but the reader cannot fail to be impressed by the lack of connection between the facts and the theory. The author seems, indeed, to have arrived at his theory of play through a purely deductive process. Since play is an instinct, and since, as we cannot admit the inheritance of acquired characters, every instinct has arisen in response to some definite practical need, and since it is evident that play has no immediate life-serving purpose, it must serve as a practice and preparation for life's serious pursuits. In this argument the premises may be sound but the conclusion has no necessary connection with them. Plays, indeed, are instinctive, and no doubt all instinctive reactions have had at some time in our racial history some life-serving meaning. But the fact that natural selection has not yet eliminated the great multitude of old racial habits with which the nervous system of the young child teems does not prove that they have been retained because of their usefulness as a practice and preparation for future life. In any animal species such as man, that lives in a changing environment, and has a long period of youth followed by a period of great rational power of transformation, we may expect behavior to be largely determined by inherited habit. As Professor Thorndike says: "We fear, not the carriers of malaria and yellow fever, but thunder and the dark; we pity, not the gifted youth debarred from education, but the beggar's bloody sore; we are less excited by a great injustice than by a little blood."[1] We are no longer so impressed by the infallible powers of natural selection as when Professor Groos wrote. Man's original nature is not so perfect as we once thought. We are more impressed by its "archaic unreason."

And even in the case of instincts which are now useful, it does not follow that, if they appear before the time of their life-serving usefulness, they must serve as a practice and preparation for such later use. Nature is not so parsimonious and calculating as that would indicate. It is not necessary to explain the doll plays of little girls as a practice and preparation for their future maternal duties. They may be simply exhibitions of a maternal instinct which sometime in the life of the individual may be useful, as when a tree showers down ten thousand seeds, of which one only may germinate. So the fighting plays of boys may be simply old racial habits, the line of least resistance for boyish activities.

In one sense, to be sure, if one should wish to look at the matter teleologically, play, like food or sleep, or like growth itself, is a preparation for manhood. But it is better to regard the child as a playing animal, realizing in himself his own end. Play, like growth or life itself, belongs to the concept of childhood. Play is just the name we give to the child's activities. In the Groos theory, as in that of Spencer, there seems to lurk the belief that the child is naturally quiescent, and that if he plays, his play must look forward to that particular aspect of life which we call his serious or bread-winning activity.

When we consider what the plays of children actually are, we discover, except in a very limited number of imitative plays, but faint resemblance between them and the serious pursuits of adult man. They resemble rather the pursuits of primitive and prehistoric man, and many of them are like the sports of adults of the present day. The plays most dear to the hearts of boys are running, jumping, climbing, coasting, skating, wrestling, wading, swimming, boating, fishing, hunting, shooting with darts, spears, arrows, or guns, building bonfires, robbing birds' nests, gathering nuts, collecting stamps, eggs, beetles or other things, flying kites, digging caves, making tree houses, spinning tops, playing horse, playing marbles, jackstones, mumblepeg, hide-and-seek, tag, black-man, prisoner's base, leap-frog, base-ball, foot-ball, tennis, cricket, golf, etc. Children of all ages have the greatest interest in pet animals, dogs, cats, rabbits, birds, horses, etc. No small part of the child's life is occupied with playing with these pets and in earlier years with toy animals of all kinds. To these plays should be added, of course, the countless indoor games, such as checkers, chess, cards, dominoes, etc.

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[1] Thorndike, Educational Psychology. The Original Nature of Man, p. 281.

These children's plays have so little in common with the later pursuits of adult life that it is evident that some quite other theory is needed to explain them than the practice and preparation theory. When the boy is grown to manhood he will not be found doing these things, except in his hours of relaxation. His serious pursuits will take other forms. He will be found cultivating the soil, harvesting his crops, shoveling dirt, sand, or coal, blasting rocks from quarries and minerals from mines, building houses, buying, selling, manufacturing or transporting goods, teaching school, healing diseases, preaching sermons, practicing law, engaging in politics or commercial transactions, giving lectures or conducting scientific research. This is the "serious" life of to-day and the life of the ancient Romans, Greeks, Egyptians and Assyrians was much the same, and it is all far removed from the play life of the child, which likewise is much the same in all ages and involves altogether simpler forms of response. If the serious life of to-day consisted in escaping from enemies by foot, horse or paddle, in living in close proximity to domestic animals, in pursuit of game with bow or gun, in subsisting on fish caught singly by hand, in personal combat with fist or sword, in throwing missiles, striking with a club or pursuing an enemy, in seeking safety in trees or caves, in living in tents or tree houses, and in sleeping and cooking by a camp fire, then we might venture to explain the play life of the child as "an instinctive activity existing for purposes of practice or exercise and without serious intent." But these are not the pursuits of adult men, *except in their hours of sport.* The great body of children's plays find their significance not in their likeness but in their unlikeness to their future laborious duties. In fact the plays of children bear a striking resemblance to the sports of men, and the latter would not be sports if they did not stand in direct contrast to work.

As regards the imitative plays of children, which indeed form but a small proportion of all their plays, the resemblance to the serious activities of adult life are, of course, closer, and to them the Groos theory of play would seem to be less strained in its application. But the imitative plays themselves are not instinctive for the reason that they are imitative. If it is meant merely that imitation itself is an impulse which has been perpetuated by natural selection owing to its usefulness in preparing children for mature life, this view might, indeed, be maintained if one still wished to put so much emphasis upon natural selection.

Other objections to the Groos theory may be passed with a mere reference. Perhaps the most serious of them is the failure of this theory to explain adult sports and to correlate them with the plays of children. Again, one is troubled by the frequent use of the word "serious" as applied to the activities of the adult, while the plays of children are spoken of as "sham," "make-believe," or "self-illusory." I do not believe that this distinction can any longer be held. Child life and its plays are quite as serious and quite as real as the life of the man. If we are to speak of "ends," it would be difficult indeed to show that the life of the grown-up is any more final or purposeful than the life of the child. Would it not be just as appropriate to say that the man's toil and sweat are a preparation for the radiant childhood of the son and daughter whom he may beget, as that the plays of childhood are a preparation for the prosaic work-life of the father? And as for seriousness, to the boy hastily swallowing his dinner or rushing through some uninteresting task to join his fellows in a game of ball or a trip to the river, it is the latter and not the former that are serious and real. It is a notable fact that most children take but a passing or trifling interest in what they eat and scarcely remember their food of yesterday. It is a peculiarity of the adult masculine mind to be very intent on the bread-winning aspect of life and on the preservation of the species. Perhaps nature exploits man for these particular aspects of life, which in themselves are but partial views. They might even be looked upon as necessary evils, subordinate in "purpose" to childhood, play, sport, art and sympathy, which are more real and final.

In reference to the Groos theory of play, some critics have been misled by the fact that certain games, like base-ball, seem to provide valuable training in such qualities as obedience, co-operation, quickness of decision, fortitude in defeat and endurance. That the game cultivates these virtues to some extent is doubtless true. One can hardly suppose, however, that natural selection has operated to form an instinct for base-ball because of its especial usefulness in providing such training. Other explanations for the fascination of this game are much simpler, as we shall see. Women, also, have need of these virtues but they do not care to play base-ball.

Professor Groos has more recently supplemented his work by a *katharsis* theory of play,[2] already anticipated by American writers. According to this particular form of the *katharsis* theory, play is a kind of safety valve for the expression of pent-up emotion, as for instance in the fighting plays of children, where the pent-up emotion is anger. According to this view, one would understand the emotions to be some kind of internal forces which would do damage if they could find no escape. It is not, however, probable that Professor Groos or anyone holds this naïve view of the emotions, and the whole relation may be more simply expressed if we suppose that the fighting plays are among the natural or spontaneous activities of children and as long as they are freely indulged in, the child is free from hurtful emotions. If these activities are repressed then no doubt would occur certain internal disturbances of a less healthful character. Where spontaneous responses are inhibited, readjustments are necessary and emotions are present. When the spontaneous response is resumed, the emotion subsides. In this way children's plays might seem to have a *katharsis* effect. In spontaneous unrestricted play, however, there would seem to be no such element present or necessary. In the sports of men indeed, an effect of this kind, as we shall see below, sometimes appears, but it is really due to the restoring of disturbed balance and the *katharsis* figure is less applicable. It is a kind of rest rather than a kind of purification. The drama, for instance, like other forms of rest and relaxation and like all play and sport, has a distinctly harmonizing effect, but when the psychological situation is carefully examined, Aristotle's medical simile is found to be not altogether appropriate.

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[2] Das Spiel als Katharsis. Zeitschrift für Päd. Psych. u. Ex. Päd. December 7, 1908.

The third theory of play has been called the recapitulation theory. This takes full cognizance of the anthropological significance of play, and indeed is based upon it. As regards the latter, all future theories of play must take carefully into account the numerous and striking similarities between the plays of children and the pursuits and customs of primitive and prehistoric man as they have been fully pointed out by President G. Stanley Hall and his associates.[3]

But the question arises as to the reason for this resemblance and if the correct reason is not found, the whole significance of play may be lost. The theory in question does not explain this resemblance except by referring it to a so-called law, the law of recapitulation, according to which each individual passes through a series of stages in his development corresponding to the stages of racial development. Even in the sphere of embryology the validity of this law has been much questioned and it is looked upon with increasing distrust when applied to the period of post-natal or psychological development. It should be said, however, that this theory of play is the only one that has attacked the specific problem of accounting for the form taken by children's play and in this attempt its success has been marked. Perhaps the most serious difficulty with this theory is its failure to explain the plays of adults and to correlate them properly with those of children.

The main purpose of the present paper is to examine more carefully the grounds of the resemblance between children's plays and the pursuits of primitive man and more particularly to determine if possible the similarity which exists between both of these and the sports of the mature man of the present time. Tentatively I will put forward three propositions, which if true would greatly simplify the psychology of play.

I. The term 'play' may be applied to all those human activities which are free and spontaneous and which are pursued for their own sake alone. The interest in them is self-developing and they are not continued under any internal or external compulsion. Play will thus include practically all the activities of children and the larger share of those of adults, such, for instance, as base-ball, foot-ball, tennis, golf, polo, billiards and countless other games and sports; diversions such as traveling, hunting, fishing, yachting, motoring, flying, dancing; vacation outings, games, races, spectacles, fairs, tournaments and expositions; the theatre, opera, moving pictures, lectures and entertainments; the enjoyment of music, painting, poetry and other arts; the daily paper, the magazine, the short story and the novel.

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[3] G. S. Hall, Adolescence, Vol. I, p. 202, *et seq.* L. M. Gulick, Interest in Rel. to Mus. Ex. Amer. Phys. Ed. Rev. VII, 2. Guillet, Recapitulation and Education. Ped. Sem., VII, 397. Robinson, The Primitive Child. N. A. R., CLIX, 467. Patrick, The Psychology of Football, A. J. P., Vol. XIV, pp. 104-117.

The term 'work,' on the other hand, will include all those activities in which by means of sustained voluntary attention one holds oneself down to a given task for the sake of some end to be attained other than the activity itself. Such activities involve mental stress, strain, effort, tension, concentration and inhibition.

II. The plays of children and the sports of adults are to be closely co-ordinated and explained by reference to the same general principles.

III. There is a striking similarity between the plays of children and the sports of men on the one hand and the pursuits of primitive man on the other. This similarity is due to the fact that those mental powers upon which advancing civilization depends, especially voluntary and sustained attention, concentration, analysis and abstraction, are undeveloped in the child and subject to rapid fatigue in the adult. Hence the child's activities and the play activities of the adult tend always to take the form of old racial pursuits.

If we look at the matter physiologically, it is very evident, in the case of the adult man, that there are some brain centers, or some form of cerebral functioning, that are put under severe strain in our modern strenuous life and that there must be some kind of activity which will relieve these centers during a considerable portion of each waking day and involve other centers not so subject to exhaustion. Such activity we call play or sport. Perhaps the word relaxation would be a more exact description of it. For our present purpose it does not matter in the least what these centers are or what manner of cerebral functioning this is. It is only necessary to note the evident fact that there is some form of cerebral activity associated with those peculiar mental powers the development of which has made possible human progress.

Nor again is it necessary for our present purpose to make any exact enumeration of these so-called higher mental processes which distinguish the modern civilized man. Generally speaking, however, they probably include a constantly increasing power of sustained attention of the voluntary kind, controlled association, concentration and analysis, together with a constantly increasing power of inhibition. The individual becomes increasingly able to hold steadily in view the image of a desired end, to inhibit the old and habitual responses which are no longer appropriate to that end, to analyze a given situation in thought, so that the response may be to certain elements in the situation rather than to the situation as a whole, and thus to meet a given situation with a new response. Only the fully developed adult mind is capable of much thinking of this kind, and at best it is highly fatiguing and cannot be continued through many hours of the waking day, so that all, or almost all, the hours of the child's day and the larger number of hours of the adult's day must be filled with responses of the simpler, more elemental and racially older kind. Consequently children's play and adult sport tend to take the forms of old racial activities, involving brain tracts that are old, well-worn and pervious.

It is well known that the present tendency in both historical and anthropological study is to place less emphasis on the differences in the mental constitution of different races of men.[4] All existing races and all historical ones, so far as we can see, are much alike in their mental powers. But from our present point of view these races are all modern. It is clearly evident that in comparing modern civilized man with the highest of the lower animals or with his prehistoric, if not even with his primitive, ancestors, there has been an unmeasured advance in the powers above mentioned. Even this assumption, however, is not necessary so far as our present theory is concerned. It is merely necessary to notice that in seeking relief from the fatigue involved in that sustained and voluntary attention, controlled association, analysis and abstraction which are essential to our or to any advancing civilization, we fall back upon a set of activities which no longer involve these processes, but which through ages of use have become familiar and easy.

Hence we understand why children's play and adult sport take the form of hunting, fishing, camping, outing, swimming, climbing, and so on through the long list. The more elemental these activities have been in the history of racial development, the greater release they afford when indulged in as relaxation from the tension of our modern life. This is well illustrated in the case of base-ball and foot-ball. Foot-ball reinstates very ancient and very elemental forms of response, such as the face to face opposition of two hostile forces, the rude physical shock of heavy opposing teams, the scrimmagelike character of the collisions, the tackling and dodging and the lively chases for goal as for cover.

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[4] Comp. Boas, The Mind of Primitive Man. Thorndike, Ed. Psy., Vol. I, p. 240.

Base-ball again is a game combining three of the most deep-seated instincts, the instinct to throw, to run and to strike. In the distant past of our race survival has come to him who could throw the straightest, run the swiftest, and strike the hardest. Throwing, batting, running are no longer of service in this age of mind, but they were once the condition of survival. To throw something at something is almost as natural for a boy as to breathe. Base-ball reinstates these ancient responses and its appeal is correspondingly great. " Base-ball," says Dr. Gulick, " is a complex of elements all of which date back certainly to our prehuman ancestors. The ability to throw a stone with accuracy and speed was at one time a basal factor in the struggle for survival. The early man who could seize the bough of a tree and strike with accuracy and great power was better fitted to survive in the brutal struggles of those early days than the man not so endowed. He could defend his family better, he was better fitted for killing game, he was better fitted for overcoming his enemies. The ability to run and dodge with speed and endurance was also a basal factor." [5]

The instinct to throw, as the same author shows, belongs to boys only, scarcely appearing in the case of girls. The awkward throw of girls, like the left arm throw of boys, is well known. The plays of girls reveal their own set of instincts recalling the habits of primitive woman. " We are the descendants of those men who could throw and those women who loved children."

The law that the more elemental the character of our responses the greater their value as relaxation and release from the tension of the strenuous life, is well illustrated in the sports of the ancient Romans. Their favorite sports took the form of spectacles exhibiting bloody contests of men and beasts. The appeal of these scenes was so powerful that no national calamity could quench the popular demand for them, a demand which could be met only by such stupendous structures as the Coliseum and the Circus maximus, the latter probably seating 300,000 spectators. But there is nothing that has been more elemental in the history of the human race than these contests. Man's racial history has been one long battle with the lower animals, defensive for life and safety, offensive for food and sustenance. So far as the work-a-day life of the

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[5] " Interest in Relation to Muscular Exercise," by Luther Gulick, M. D. American Phys. Ed. Rev., Vol. VII, 2.

Romans is concerned, it was much the same as ours, taxing the same higher mental powers and demanding relaxation in the form of older and simpler pursuits. Even now, cock fights, bull fights, and prize fights have a powerful fascination for certain classes of people. As Dr. Gulick says, "The racially old is seized by the individual with ease and joy."

We are now able to understand why certain sports, such as golf, base-ball, foot-ball, the dance, the prize fight, and perhaps the fighting plays of children seem to have a kind of *katharsis* effect. They offer a release which is not found in such sports as bicycling, motoring, moving pictures, lectures, and entertainments. The latter, indeed, afford a certain rest and recreation, but being less ancient and elemental, the release they afford is not so great. In the game of golf the situations are all elemental,—the stick, the ball, the swinging stroke, the return to outdoor life, the tramping over hill and through ravine and the recreational value of this game is very great. In the case of base-ball, foot-ball, the circus and the spectacular games, the spectators rather than the participants are the ones who enjoy the greater relaxation. Indeed, for the latter it is, at any rate in the professional games, a form of work rather than of play, since it is engaged in for ulterior ends. For the spectators, however, these games afford an absolute rest, relieving the higher brain centers completely and allowing the individual to revel in old and latent racial memories. This complete abandonment to primitive instincts is clearly shown in the behavior of the spectators at a great foot-ball match, in their facial expression, their shouting, their gesticulation and their language. The dignified man of office, pulpit, laboratory or lecture room is scarcely recognizable.

Stage managers, story writers and moving picture shows seek always for a new thrill. It is sometimes thought that the new and unexpected is thrilling. The reverse is true. The thrilling is the old and elemental. When love and warfare fail, the story writer can always fall back on the horse race for thrills. The horse has little significance for the life of to-day and it is fast becoming less, but he has had an intimate relation with the life history of the race. It is difficult to read any well-told story of a horse race or chariot race or any account of human rescue by means of equine or canine intelligence without an emotional disturbance out of ail proportion to the importance of the event. Likewise all new exhibitions of speed are thrilling. The supreme joy in speed, whether exhibited in running, skating, coasting, or riding with fast horses, cars, sailing vessels or air ships is explained when we recall the survival value of speed in human history. It points back to ages of racial experience in pursuit of and escape from both man and beast.

From our point of view, therefore, the psychology of play is much simplified. So far as the plays of children are concerned, they play because they are children, which means that play is the name we give to their activities. If the child does anything, he must play, for the simple reason that those brain centers upon which work depends have not yet begun to function. The child's activity therefore, takes the form, or tends to take the form, of long established racial habits. In manhood the plays are much the same and the explanation is much the same. The grown man has mental powers which the child hardly yet possesses, but he cannot use these during all the waking hours of his day. When he uses them he is working; when not, he is playing; and the essential character of all his play is that it shall offer release from the strenuous life, whether the latter take the form of acute mental work or whether it take the form of sustained effort to keep at a given task after interest in it has ceased.

Our modern life, whether in the laboratory, the school room, the lawyer's or the merchant's office, or whether in the factory or the shop or on the farm, is a life of high tension. Release from it is essential and unless this release take healthful forms, as in play, sport, outdoor life, holidays, etc., it will take unhealthful forms, as in dancing crazes, war crazes and the like. A form of artificial and temporary release from the strenuous life is found in the use of narcotics of all kinds, such as tobacco, alcohol and other drugs, whose action is to paralyze slightly the higher brain centers and release the older and more primitive impulses. Their effect is similar therefore to that of play. Unfortunately no one yet knows just how much damage to the individual and to the race this constant doping of the brain may effect. The action of these drugs is not yet well understood. That of tea and coffee still less. But when we recall that the annual consumption of alcoholic drinks in the United States is more than two thousand million gallons, of tobacco about 440 million pounds, of coffee more than 858 million pounds and of tea about 94 million pounds, and that none of these things, so far as is known, add anything to the physical economy of the body, it is evident that we have here fruitful themes for further physiological and psychological studies.

In fact the world has lately been getting too severely serious and laborious. Too much hard thinking is demanded to keep up the modern pace. Whether in journalism, in literature, in scientific research, in mechanical invention, in social and educational reform, in labor movements, or in the feverish struggle for wealth, the higher brain centers are taxed to a degree incommensurate with the possibility of physiological adjustment. Our physical constitution cannot so quickly adapt itself to this sudden increased demand upon certain specific nervous functions comparatively new and unstable. Reactions of one kind or another are therefore inevitable. We are witnessing a marked increase in insanity and a new and startling demand for narcotic drugs. In America we have the amusement crazes, obsessions of dancing, motoring, base-ball, moving pictures, etc., together with a healthy revival of athletic sports, playground and recreation movements and interest in out-door life. In Europe, where the temper of the people lends itself less readily to these forms of release, we have witnessed the reaction in its most repulsive form, in a debauch of bloodshed, in a return to the most brutal and the most elemental of human reactions, that of war, which rests the higher brain centers completely. It is really a physiological situation that the peace societies have to contend with. Mankind cannot so easily escape from its long past.

In conclusion it should be said that it is doubtful whether the tendency shown in children's play and in adult sport to take the forms of old racial activities can be subsumed under such names as survival, reversion, or recapitulation. These biological terms are all too narrow and they carry a certain reproach which does not pertain to the play and sport activities. It is a wholly unwarranted assumption that those peculiar forms of psychosis which in a special manner characterize the adult masculine mind are of any higher order than those which are exhibited in play in the broader sense in which we have used the term. The latter represent more fundamental forms of human behavior and perhaps more valuable. Just at the present time evolution seems to be tending toward the development of those high-tension masculine traits by which man adapts himself to his environment and which produce something which we call progress or civilization, a civilization, however, in no way remarkable except in the way of its frenzied reactions. It is the age of work, the age of stress and effort and tension, the expansive, centrifugal age, the age of outer conquest but not of inner harmony. At such a time, comforts, luxuries, and inventions abound, side by side with profound misery. Is it not possible to think of a higher civilization than ours,—a civilization faintly realized by the ancient Greeks—where the play motive will be ascendant and where a greater degree of repose, of measure, and of harmony will be attained?

References

Allin, Arthur. Play. University of Colorado Studies.

Angell, Emmett. Play. Little, Brown & Co., 1912.

Appleton, L. E. A Comparative Study of the Play Activities of Adult Savages and Civilized Children.

Binet, A. Les Idees modernes sur les enfants.

Binet, A. and Henri, V. La fatigue intellectuelle.

Boas, F. The Mind of Primitive Man.

Bolton, F. E. Hydro-Psychoses. *Am. Journ. Psych.*, Vol. 10, pp. 169-227.

Bolton, H. C. The Counting-Out Rhymes of Children.

Boyle, D. The Persistence of Savagery in Civilization. *Proc. Canadian Institute* (Toronto), 1886, pp. 129-131.

Brewer, W. H. The Instinctive Interest of Children in Bear and Wolf Stories. *Proc. Amer. Assoc. Adv. Sci.*, 1893, pp. 309-311.

Bryan, E. B. Nascent Stages and their Pedagogical Significance. *Ped. Sem.*, Vol. 7, pp. 357-396.

Burk, C. F. The Collecting Instinct. *Ped. Sem.*, Vol. 7, pp. 179-207.

Burk, Fred. From Fundamental to Accessory in the Development of the Nervous System and of Movements. *Ped. Sem.*, Vol. 6, pp. 5-64.

—— ——. The Influence of Exercise upon Growth. *Am. Phys. Ed. Rev.*, 1899, p. 340.

Burnham, W. H. Education from the Genetic Point of View. *Proc. N. E. A.*, 1905, pp. 727-734.

Carr, H. A. The Survival Values of Play.

Chamberlain, A. F. The Child. Chapter 2.

—— ——. Work and Rest; Genius and Stupidity. *Pop. Sci. Mo.*, Vol. 60, pp. 413-423.

Chambers, W. G. Why Children Play. *Proc. N. E. A.*, 1909, pp. 720-726.

Claparede, E. Psychologie de l'enfant et pedagogie experimentale. *Exper. Ped.*, p. 125 f.

Colozza, G. A. Psychologie und Pädagogik des Kinderspiels.

Compayré, Gabriel. Die Entwicklung der Kindesseele.

Cromie, W. J. Eight Minutes Common-Sense Play for the Growing Child. *Outlook*, Sept. 23, 1914.

Croswell, T. R. Amusements of Worcester School Children. *Ped. Sem.*, Vol. 6, pp. 314-371.

Dearborn, George V. N. Motor-Sensory Development.

Dewey, John. Play. Cyclopedia of Education.

Eastman, Charles. Indian Boyhood.

Gillin, J. L. The Sociology of Recreation. *Amer. Jour. of Sociology*, Vol. 19, No. 6. May, 1914.

Gould, George M. Child Fetiches. *Ped. Sem.*, Vol. 5, p. 421.

Groos, K. Das Spiel als Katharsis. *Zeit. f. Päd. Psych. und Exp. Päd.*, 12, 7, 8.

—— ——. The Play of Animals.

—— ——. The Play of Man.

Guillet, C. Recapitulation and Education. *Ped. Sem.*, Vol. 7, pp. 397-445.

Gulick, L. H. Some Psychical Aspects of Muscular Exercise. *Pop. Sci. Mo.*, Vol. 53, pp. 793-805.

—— ——. Psychological, pedagogical and Religious Aspects of Group Games. *Ped. Sem.*, Vol. 6, p. 135-151.

—— ——. Interest in Relation to Muscular Exercise. *Am. Phys. Ed. Rev.*, Vol. 7, pp. 340-349.

HADDON, ALFRED C. The Study of Man.

HALL, G. STANLEY. A Study of Fears. *Am. Jour. Psy.*, Vol. 8, pp. 147-249.

—— ——. Children's Collections. *Ped. Sem.*, Vol. 1, pp. 234-237.

—— ——. Adolescence. Esp., Vol. 1, Chapter 3, and Vol. II, pp. 202-236.

—— ——. Youth; its education, regimen and hygiene. Chapter 6.

—— —— and ALLIN. Tickling and Laughter. *Am. Jour. Psy.*, Vol. 9, pp. 1-41.

—— — and Pupils. Aspects of Child Life and Education. Esp. the articles on The Story of a Sand Pile—Hall.
A Study of Dolls—Ellis and Hall.
The Collecting Instinct—Burk.
Fetichism in Children—Ellis.

HANCOCK, JNO. A. Work and Play. Education, Vol. 25, pp. 257-268.

HENDERSON, E. N. Principles of Education. Chapter 13.

HILDEBRANDT, PAUL. Das Spielzeug im Leben des Kindes. 1904.

HUTCHINSON, WOODS. Can the Child Survive Civilization. Playground and Recreation Association of America.

JOHNSON, G. E. Education by Plays and Games with Bibliography.

JOHNSON, J. Rudimentary Society among Boys. *Johns Hopkins U. Studies in History and Pol. Sci.*, Vol. 2, pp. 495-546.

—— ——. The Savagery of Boyhood. *Pop. Sci. Mo.*, Vol. 31, pp. 796-800.

KING, IRVING. The Psychology of Child Development.

KIRKPATRICK, E. A. The Individual in the Making.

LAZARUS, M. Die Reize des Spiels.

LEE, JOSEPH. Play as Medicine. Playground and Recreation Association of America.

—— ——. Play as an Antidote to Civilization. Idem.

LELAND, ARTHUR and LORNA H. Playground Technique and Playcraft.

McDOUGALL, W. Social Psychology. Esp., p. 113ff.

McGHEE, Z. A Study in the Play Life of some South Carolina Children. *Ped. Sem.*, Vol. 7, pp. 459-478.

MONROE, W. S. Play Interests of Children. *Proc. N. E. A.*, 1899, pp. 1084-90.

MONTESSORI, MARIA. Pedagogical Anthropology.

MOSSO, A. Fatigue. Esp. Chapter on Attention.

NEWELL, W. W. The Games and Songs of American Children.

OPPENHEIM, N. Mental Growth and Control.

—— ——. The Development of the Child.

PATRICK, G. T. W. The Psychology of Relaxation. *Pop. Sci. Mo.*, June, 1914.

QUANTZ, J. O. Dendro-Psychoses. *Amer. Jour. of Psych.*, Vol. 9, pp. 831-42.

REPPLIER, AGNES. Essays in Idleness.

RIVERS and KRAEPELIN. Ueber Ermüdung und Erholung. *Psych. Arbeiten*, Vol. 1, pp. 627-678.

ROBINSON, LOUIS. Darwinism in the Nursery. *Nineteenth Century*, Vol. 30, pp. 831-842.

SANDIFORD, PETER. The Mental and Physical Life of School Children. 1913.

SANFORD, E. C. Mental Growth and Decay. *Amer. Jour. Psy.*, Vol. 13, pp. 426-49.

SCHILLER. Aesthetical and Philosophical Essays.

SCHNEIDER, G. H. Der Thierische Wille.

—— ——. Der Menschliche Wille.

SHULER, ELLIS W. The Passing of Recapitulation. *Ed. Rev.*, Vol. 44, 191-6.
SEASHORE, C. E. Psychology in Daily Life. Chapter 1. Play.
SPENCER, H. Principles of Psychology. Vol. 2. Chapter 9.
STANLEY, H. M. Professor Groos and Theories of Play. *Psy. Rev.*, Vol. 6, pp. 86-92.
STRACHAN, J. What is Play?
STREET, J. R. A Study in Moral Education. *Ped. Sem.*, Vol. 5, pp. 5-40.
SWIFT, E. J. Youth and the Race.
TANNER, A. E. The Child; his thinking, feeling and doing.
THOMAS, W. I. The Gaming Instinct. *Am. Jour. Sociology*, Vol. 6, pp. 750-63.
THORNDIKE, E. L. Educational Psychology. Vol. 1. Chapters 15, 16, 17.
TRETTIEN, A. W. Creeping and Walking. *Am. Jour. Psych.*, Vol. 12, pp. 1-57.
TYLOR, E. B. Primitive Culture.
VANDEWALKER, N. C. The Culture-Epoch Theory from an anthropological Standpoint. *Ed. Rev.*, Vol. 15, pp. 374-391.
WUNDT, W. Principles of physiological psychology. Chapter on Attention, Vol. 1, pp. 316-320.
—— ——. Human and Animal Psychology. Lecture 24.

A NOTE ON THE SINISTRALITY OF CHILDREN

Prompted by the work of P. B. Ballard[1] with left-handed children, the following observations were made on three naturally left-handed boys, eight years of age, who had been taught to write with the right hand.

Following Mr. Ballard's methods, six eye-tests and eight foot-tests were made, showing the boys to be left-eyed and left-footed respectively. No tendency to stammer was observed.

When not observed, these boys drew with the left hand, with better results than when using the right hand. When the objects to be drawn were not symmetrical, there was a reversal, that is, the left side of the object was drawn on the right side and the right side on the left. They also wrote spontaneously in the mirror, seemingly showing that the left hand had been trained at the same time as the right.

Again, using four tests with a class of fifty-eight boys, twelve proved to be right-footed, eighteen left-footed, the others using either foot indifferently. All proved to be right-eyed, except the three dextrosinistrals (left-handed persons taught to write with the right hand) and two other boys, one of whom wrote well with the left hand.

Full details of this work were published in the March number, 1913, of the *Bohemian Pedagogical Review* (*Pedagogické Rozhledy*).

EMANUEL LIPPERT.

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[1] Ballard, P. B. Sinistrality and Speech. *Jour. of Exper. Ped.*, vol. I, 1912, pp. 298-310.

BOOK NOTES

The Hygiene of the School Child. By Dr. Lewis M. Terman, Associate Professor of Education, Leland Stanford Jr. University. Houghton-Mifflin Co. $1.65.

This is a volume devoted to the conservation of the health of children of school age, and more especially to those who are in attendance at school. Probably the most important chapters bear the following headings: the physical basis of education, general laws of growth, factors influencing growth, physiological differences between children and adults, educational significance of physiological age, disorders of growth and hygiene of posture, malnutrition in school children, tuberculosis and the school, physiology of ventilation, teeth of school children, hygiene of vision, preventive mental hygiene, speech defects of school children, sleep of school children, and the final chapter, some evil effects of school life.

The author has, as the above headings indicate, devoted the main part of the book to a consideration of the problems of the health of children, and has not undertaken in any adequate manner to discuss the connection between the physical environment of school life and the health of school children. The volume contains much information gathered from the published results of scientific investigations made in all progressive countries. At times one feels that some of the information thus introduced has but little bearing on the question in hand, but in general the facts collected are well worth while, and will materially aid those who are in search of a broader point of view. This book may be heartily commended to all who are striving both to conserve and develop the physical and mental health of our children. F. B. DRESSLAR.

Health Work in the Schools. By Dr. E. B. Hoag and Dr. Lewis M. Terman. Houghton-Mifflin Co., Boston. pp. xiv-321

This is a decidedly useful book for school health officers, superintendents, and teachers. It deals, as the title indicates, with the problems which always arise when school officers set to work in a careful way not only to guard the health of the school children, but also to see to it that they develop better health. The chapter headings are as follows: Social responsibility for the health of school children; The scope and administration of health supervision; Plans for organization for health work; The school nurse: including suggestions for health supervision by the 'nurse alone' plan; The health grading of school children by teachers; A demonstration clinic for instruction in the observation of defects; The school medical clinic; School dentistry; Transmissible diseases (three chapters); Open-air schools; School housekeeping; The teaching of hygiene: first six grades; The teaching of hygiene: seventh and eighth grades; The teaching of hygiene: education with reference to sex; The teacher's health; What the world is doing for the health of school children; Appendix, which includes a short statement of the organization and administration of health work in a few of the important cities of the country, a suggestion for a teachers library in school hygiene, and a glossary.

At the close of each chapter a selected list of references to the most important magazine articles and books bearing on the theme of the chapter, is given. The book is designed to help place the emphasis on health teaching and health development, instead of upon the usual incomplete 'medical inspection' method.

F. B. DRESSLAR.

Fourth International Congress on School Hygiene, Buffalo, New York, U. S. A., August 25-30, 1913. Transactions. 5 volumes. Buffalo, Thomas A. Storey, 1914.

Of these stately volumes, the first is almost entirely devoted to the organization and the transactions of the Congress and the names and addresses of those connected with it, together with the few papers on the program of the general meetings, viz., the address of the president, C. W. Eliot, that of Sir James Grant on school hygiene and child life, and that of G. Stanley Hall, the hygiene of appetite and that of eating. The second volume begins the section meetings by sessions, the first being the hygiene of buildings, grounds, material equipment and upkeep; the second, that of school administration, curriculum, etc. Volume three begins the instruction in hygiene, fatigue, nervousness, the mentally abnormal child, with special instruction in hygiene. The fourth volume, section three, is medical hygiene and sanitary supervision. Then follows school hygiene, relation to the home and the community. While the fifth volume begins with crippled children, the conservation of vision, mouth hygiene, etc., and passes on to tuberculosis, child labor, the abnormal child, the Binet-Simon school. Section five is of psycho-education clinics. This fourth Congress will rank high among the series so far held, but in the general sentiment of those present it will not be deemed quite equal to the European Congresses that have preceded it. The attendance of foreigners, particularly those of prominence, was relatively very small, although a few of the best men were on hand. The secretarial and organizing work was done with remarkable efficiency, and all in all this is by far the most important meeting ever held in this country on this new and vital subject. It is of great interest as revealing the state of progress and of general knowledge which has so far been attained in this country.

The Mental Health of the School Child. By J. E. WALLACE WALLIN, Ph.D. New Haven, Yale University Press, 1914. 449 p.

After many years of study and experience this author has at last gathered his conclusions into a very attractive and suggestive volume of nineteen chapters, covering such topics as medical and psychological inspection of school children, the new clinical psychology and psychologist, what the former is and is not, functions of the psychological clinic, its distinction from school hygiene, its human efficiency, research in a New Jersey state village for epileptics with results from the Binet-Simon tests, present status of these tests of intelligence, current misconceptions regarding them, re-averments respecting psychogenetical norms and schools of development, individual and group efficiency, euthenical and eugenical aspects of infant and child orthogenesis, the latter as applied to oral, dental and mental methods of measuring orthophrenics, of removing physical handicaps, mental and dental inspection in Cleveland public school, provision for the mentally unsound children, and a scheme for the clinical study of more unusual children. The book abounds in graphs, tables, is well printed, and indicates and constitutes altogether the very best contribution to American studies in this field. The author gives us here a happy combination of large theoretical and detailed practical studies.

Pre-Meiji Education in Japan. A Study of Japanese Education previous to the Restoration of 1868. By FRANK ALANSON LOMBARD. Tokyo, Japan, Kyo Bun Kwan (Methodist Publishing House), 1913. 253 p.

This writer has spent many years in his present chair of education in Doshisha University, Japan, and has also spent some two years in residence at Clark University. The world has come to look with great interest on the marvelous system of philosophy, ethics, and educational ideals in ancient Japan, before the new regime that began in 1868. The government some years ago had gathered up the very comprehensive literature concerning this ancient Bushedo, or chivalric period, and this has made it accessible. We rather infer, although we cannot distinctly tell, that this is the first English author to use this material. The chapters are, the first intellectual awakening, the government system of education from 1602 to 1868, individual efforts, literary culture and education of women, social education, physical training, foregleams of the second great awakening, and finally educational problems. The book will constitute interesting reading for all concerned with education.

Eugenics: Twelve University Lectures. New York, Dodd, Mead & Co., 1914. By different men. 342 p.

The topics of this very interesting and valuable book are: The Eugenics Program and Progress in Its Achievements, by C. B. Davenport; Eugenics as Viewed by the Zoologist, by R. H. Wolcott; Eugenics from the Point of View of the Physician, by B. C. Vaughn; Eugenics as Viewed by the Physiologist, by W. H. Howell; Eugenics, Its Data, Scope, and Promise as Seen by the Anatomist, by H. E. Jordan; The View of the Geneticist, by J. Webber; The First Law of Character-making, by A. Holmes; Eugenics from the Standpoint of the Sociologist, by C. A. Elwood; Its Social Limitations, by G. Keller; Selections from an Address by W. H. Carruth; Eugenics and Economics, by M. A. Aldrich; Eugenics with Special Reference to Intellect and Character, by E. L. Thorndike.

Principles of Eugenics. By BLANCHE EAMES. New York, Moffat, Yard & Co., 1914. 90 p.

This little primer touches on heredity, instruction in sex truths, tobacco and drugs, parental instruction and environment, and finally continence. Each chapter has a few references which shows that the author has read wisely and well, and the book unquestionably has a place of its own due to its completeness and simplicity.

The Thinking Hand or Practical Education in the Elementary School. By J. G. LEGGE. London, Macmillan & Co., 1914. 217 p.

This book is the result of long and observant practical work. It treats of the growth of the idea, the application of the principle, work and play, a dream, plain facts, with five schemes mainly for girls, and four mainly for boys and has a score and a half of illustrations. The purpose of the book is to give some idea of one of the most effective of the present day movements, viz., the development of the manual side of the curriculum, not in opposition to the intellectual, but in association with it. The book is written in plain English, not "pädagogische," and is in a spirit of protest against the mystogogic and its pretentious, portentous solemnity, which seems to the author a menace. He well defends himself against the old ideas of general as against special education, and then against the charge of trenching on the technical field. We hear too much of the captains of industry and neglect the rank and file. Industry is always for the sake of the product, and it is wrong to focus on the process only. Kerschensteiner has understood this idea. The author's title is the happiest and most apposite we can think of in all the wide literature of this field. More than a third of the book is devoted to illustrations and another third to details, schemes, and explanations. On the whole it is a most helpful addition to our knowledge on this subject.

The Modern High School: Its Administration and Extension. Edited by CHARLES HUGHES JOHNSTON, Ph. D. New York, Charles Scribners Sons, 1914. 759 p.

This work treats of the social administration of the high school, its institutional relations, legal status as a business enterprise, relations to the elementary and to higher and industrial education. Part two deals with the more intimate and specialized relationships of high school work, such as its curriculum, details of class management, direction of study as the chief aim, social value of school versus home study, form and school association, the conservative agencies. Part three deals with definite internal expressions of the social nature and function of the high school, its internal government, improvement of teachers, social activities of students, athletics, debates, journalism, fraternities. While part four deals with the high school as a social centre, continuation work, high school library, vocational and avocational guidance, cooperation in teaching, English, hygienic considerations, the high school as an art centre, its moral and religious agencies. The thirty chapters that constitute this book are mainly written by different authors and present very interesting and vital aspects of the great problem of the high school.

High School Course of Study. A constructive study applied to New York City. By CALVIN O. DAVIS. Yonkers-on-Hudson, New York, World Book Co., 1914. 166 p. (School Efficiency Series. Edited by Paul H. Hanus.)

The high school is happily now at last in the centre of discussion and it is earnestly to be hoped that present interest will not flag until reconstructions have been radical. This study, confined to New York City, is still further limited by its subject. The writer discusses the newer aims and conceptions, general and special aspects of the program, high school systems in ten cities, a general course in New York City compared with others of the ten, actual administration, special courses in New York City, criticisms and recommendations, summary. In our opinion, an author who confines his view essentially to New York City, or even to ten representative American cities, cannot be expected to reach the root of the difficulty with the high school. Most of his recommendations, however, are wholesome. They are that the high school shall be available to all young people, with additional schools of different types, pay for transportation, more manual, domestic, commercial, statistical, scientific and other courses, more intensiveness and continuity to English, plane geometry, science, music, art, oral expression, and more flexible administration with less rigid specialized requirements for examination. Fifteen periods of English, four of history, four in science, four in social sciences, five in United States history, etc., totaling forty-eight periods. There should be more specific subjects for each year, a list of which is here given. Foreign languages should alternate with mathematics, principals should cooperate with their teachers, there should be suggested parallel curricula.

State and County Educational Reorganization. By Ellwood P. Cubberley. New York, Macmillan Company, 1914. 214 p.

The author first gives the revised constitution of Oseola in 1913. Then follows revised school code with its administrative and educational organization, defining functions of the state, the board, the educational department. Then the county and district are discussed. The second title is the system of public instruction, elementary and secondary. Then comes vocational and supplemental, and higher and professional education, the support of the system, funds, the environment and equipment including buildings, health, sanitation, teaching force, their training, qualification, form of certificate, appointment, tenure, pay, pensions, reading circles, institutions, the state and the child.

Childhood and Youth Series. Indianapolis, The Bobbs-Merrill Co., 1914.
Learning and Doing. By Edgar James Swift. 226 p.
The Child and his Spelling. By W. A. Cook and M. V. O'Shea. 254 p.
The High School Age. By Irving King. 225 p.
Natural Education. By Winifred Sackville Stoner. 272 p.

The Bobbs-Merrill Company here undertakes to present a culture series of works on childhood and youth by eminent experts, and these four volumes constitute the first installment of a more comprehensive scheme. Professor Swift's book is constructive and appreciative, and shows that he keenly appreciates the difficulties of both parent and teacher. The style is simple, direct, lively, and untechnical, and the author's end is largely practical. The chapters are as follows: the revolt from monotony; efficient teaching; gaining results; progress in learning; economy in learning; habit in learning and achievement; new demands on the school. The book has a very convenient index and a page or two of references of the literature bearing upon each chapter. It is admirably designed to meet the end which the series and which this special volume proposes, and was written by an expert who has unusual command of his subject.

The book by Professors Cook and O'Shea is a careful study of the rules for spelling, sources and causes of errors, the life history of certain spelling, columnar versus contextual spelling, methods of presentation, spelling efficiency, composition, some special factors in spelling. These chapters deal with learning to spell, while part second treats of spelling vocabulary under the captions of peculiar views of spelling, needs determining the written vocabulary of typical Americans, sources and character of data, certain lists derived from correspondence, spelling texts and needs, with an appendix of words used spontaneously by pupils. There is also a good reference list for further reading. This is a more technical study, the first part dealing with themes of special interest to teachers, and the second with those that should appeal alike to teachers and parents. It is the first adequate and comprehensive attempt in English to sum up the many careful studies that have been made upon this subject from the time when Rice's now famous study began.

Adolescence has in the last decade become celebrated in literature. Nevertheless, we know very little about it, especially in the case of girls. Chapters in Professor King's book are: waste in the high school; physical changes of high school years; physical development and school of efficiency; a concrete case of the latter; mental changes in the teens; broadening vision; the birth of a new self; characteristic phases and dangers of the new self; high school period in retrospect; economic relations and social interests of the high school pupils; their study, habits, and amusements; the relation of sex in the high school to the entering age; and the adaptation of the high school to the needs of its pupils. This volume seems to the writer of this review the most inadequate of the series so far. The beginning of the high school age by no means corresponds with adolescence, and save a single reference, or perhaps two, there is no allusion to Dr. Hall's work, a comprehensive treatise which the author seems to have studiously ignored.

The topics treated in Miss Stoner's book are: notable examples of the early direction of tendencies by parents; earliest development; learning to talk; learning through nature's nurse, play; music and spelling; learning about nature; learning through stories, games and rhymes; learning foreign languages; explanations in the realm of mathematics, educational amusements; cultivation of the imagination; punishment by natural consequences; health first of all; parental influence and environment. The appendix contains a list of "magazines for children, mothers, and teachers, books which have helped Winfred, educational books that have helped me."

Literature for Children. By ORTON LOWE. New York, Macmillan Company, 1914. 237 p.

This is a book about books. There are first selections for memorizing for each school year from the first to the eighth. The next part treats the sources of standard prose for children. The peruser of this book will first of all try to ascertain on what principle the books and selections are made, and as far as he can gather, the author here has done nothing more than follow his own practically uncontrolled ideals as to what is best for children, and hence we have simply another of the innumerable rather *a priori* ideas of what is best, ideas on which no two people at present agree.

Your Child To-day and To-morrow. By SIDONIE MATZNER GRUENBERG. Philadelphia and London, J. B. Lippincott Co., 1914.

This books deals with some problems for parents concerning punishment, lies, fear and imagination, obedience, ideals and ambitions, work and play, social activities, adolescence, and heredity. The work is dedicated to the author's mother and children. As a member of a child study group she has found a vast body of material which she here seeks to make of practical use to the bringing up of children. Considerable attention is given to the instinct to create, climb, habit, play, romping, the danger that we shall forget how to play with children, and the advantages of country life.

Physical Growth and School Progress. A Study in Experimental Education. By BIRD THOMAS BALDWIN. U. S. Bureau of Education, Bulletin, 1914, No. 10. Washington, Government Printing Office, 1914. 212 p.

The author bravely reviews, though briefly, the whole history of the subject and finally conveniently summarizes for us his own conclusions, correlated with those of literature. We have only space for a very few of his general conclusions, viz., first born children exceed those later born in height, and shorter continue to grow longer than tall children; growth in height is rhythmic; dull children are shorter than precocious children; country boys are taller than city boys; lungs share to a marked degree the augmented development of adolescence; the law of mean precocity is related to mean physical development, and average precocity to average physical development.

The Chalif Text Book of Dancing. By LOUIS H. CHALIF. New York, Published by the author, 7 West 42nd Street, N. Y., 1914. 171 p.

The author of this work is past master in his art, combining in a very unusual degree theory and practice. In Europe he was a ballet master, and it is understood that he resigned this position and spent years in traveling to study the folkdances of various nations. He came to this country almost unknown and came near being exploited at first, but is at length making good and there is a large and increasing group of people who will welcome this modest handbook which makes no pretense and utterly eschews theory, but preserves the best portions of the Russian theory and practice of dancing.

Among English Hedgerows. By CLIFTON JOHNSON. Chautauqua Press, 1914. Chautauqua Home Reading Series. 347 p.

This book deals with the rural village, an evening with the nightingale, country work and workers, a springtime walk, home of the pilgrims, home of King Arthur, Stone-Henge, etc., and is illustrated by several score of pictures. The book has a brief commendatory introduction by Hamilton W. Mabie.

Through England with Tennyson. By OLIVER HUCKEL. Chautauqua Press, 1914. 243 p. Chautauqua Home Reading Series.

This work treats of Lincoln and Lincolnshire, the fens, Somersby, the poet's birthplace, Louth and the old grammar school, Cambridge and college days, Tennyson's London, wedding-day, Hallam, Hawarden, Farringford and the Surrey Hills, Tintagel and King Arthur, Amesbury Abbey and Queen Guinevere, Camelot, etc., and has about two score illustrations.

Democratic England. By PERCY ALDEN. Chautauqua Press, 1914. 263 p. Chautauqua Home Reading Series.

This volume is a series of articles written for the Chautauqua Magazine and brought up to date with one new chapter on state insurance. The chief items are: child and the state; sweating; the problems of old age, of housing the debtor, of municipal ownership, the labor movement, the municipality, land and the landless.

The Question of Alcohol. By Edward H. Williams, M. D. New York, The Goodhue Company, 1914. 121 p.

This work contains chapters on the drug habit menace, temperance instruction in public schools and its results, liquor legislation and insanity, the liquor question in medicine, what shall we do about it.

Primary Handiwork. By Ella Victoria Dobbs. New York, Macmillan Co., 1914. 121 p.

The author follows the rubrics paper-cutting and poster-making, booklets, criticism and standards of workmanship, the house problem, the village street, sand-tables and what to do with them, animals and toys, holidays, general suggestions and summary. Some of the sixty odd cuts are ingenious, interesting and new.

The Beginner's Garden Book. A Textbook for the upper Grammar Grades. By Allen French. New York, Macmillan Co., 1914. 393 p.

This work is divided into autumn and winter work and the sections treat gardening under glass and the real garden. It is an interesting book combined with 211 illustrations and shows to good effect what has been done and can be done in the grammar grades.

Art in Education and Life. By Henry Davies, Ph. D. Columbus, Ohio., R. G. Adams & Co., 1914. 322 p.

Professor G. T. Laird in his introduction well pleads for a larger place for aesthetic culture in our system of education, and the author after defining the problem discusses the nature and conditions of taste, the aesthetic resources of the schools, methods of developing taste, the educational value of the drama, democracy and art, and the warrant for reform. A rather meagre English bibliography is given at the end.

Souvenirs d'Education Familiale. Edited by J. Renault. Paris, P. Lethielleux, 1914. 200 p.

This is an interesting book giving some little sketch by each of the more prominent workers in this field in France, the pictures of whom are reproduced.

Undersökningar över Intelligensmätningarnas Teori och Praxis. Av G. A. Jaederholm. 2 Vol. Stockholm, Alb. Bonniers Boktryckeri, 1914. 386 and 268 p.

At the Back of the North Wind. Simplified by Elizabeth Lewis. Philadelphia and London, J. B. Lippincott Co., 1914. (George Macdonald Stories for Little Folks.) 126 p.

The New York Times Index. A Master-Key to all Newspapers. Vol. II, No. 1, January-February-March, 1914. New York, New York Times Co., 1914. 489 p.

L'Année Pédagogique. Publiée par L. Cellérier et L. Dugas. Paris, Librairie Félix Alcan, 1914. Troisième Année, 1913.

The Tangible Rewards of Teaching: a detailed statement of salaries paid to the several classes of teachers and school officers. Compiled by James C. Boykin and Roberta King. U. S. Bureau of Education, Washington, Government Printing Office, 1914. 461 p.

Primary Book. By Florian Cajori. New York, Macmillan Co., 1914. 285 p.

Handbook of Practice for Teachers. By Charles A. McMurry. New York, Macmillan Co., 1914. 141 p.

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MEASUREMENTS OF ABILITY TO SOLVE ARITHMETICAL PROBLEMS

By Edward L. Thorndike
Teachers College, Columbia University

Certain measurements which the coöperation of many principals and teachers in Massachusetts enabled me to make give results which seem worth reporting concerning three topics: Educational scales, Sex-differences and Retardation.

The measurements were of the success or failure of some 4,500 pupils in solving each of four problems in arithmetic, the following being the instructions issued to the principals:

Instructions

The experiment is a very simple one. It is to give the following work in arithmetic (without any preparation whatsoever) to any 6th, 7th, 8th or 9th grade class. A copy of the problems given below should be put upon the blackboard together with the instructions printed below. Forty minutes should be allowed for the test.

At the end of exactly 10 minutes say, "Leave example 1 even if you have not finished it. Try No. 2 now." At the end of exactly ten minutes more say, "Leave example 2 even if you have not finished it. Try No. 3 now." At the end of exactly ten minutes more say, "Leave example 3 now even if you have not finished it. Try No. 4 now." Stop all work at the end of exactly 40 minutes.

At the close of the test have each child write on the *back* of his paper—his name, the month his birthday comes in, and his age at his last birthday. The record sheet enclosed should be filled as shown.

Send the record sheet to E. L. Thorndike, Montrose, Westchester Co., N. Y. All results will be kept absolutely confidential.

To Be Written on the Blackboard

Find the answers to these problems.

Do Number 1 first. Do not begin Number 2 until I tell you to do so.

If you finish Number 1 before I tell you to begin work on Number 2, look over your work to be sure that it is right.

1. A boy had 3 dollars. He paid it all for four articles, which we will call A, B, C and D. B cost as much as C. C cost as much as D. A cost as much as B, C and D together. The boy sold A and B for 1½ times what he paid for them. He sold C and D for 1¼ times what he paid for them. How much did he get for the four articles?

2. John had $1.20 Monday. He earned 30 cents each day on Tuesday, Wednesday, Thursday and Friday. Saturday morning he spent one-third of what he had earned in the four days. Saturday afternoon his father gave John half as much as John then had. How much did his father give John?

3. During one week Mary studied her history twenty minutes each day for six days. She studied her spelling three-fourths as long as she studied her history. She studied her arithmetic three-quarters of an hour a day, but only on two days. How many hours did she study all three together during the week?

4. A boy bought 1½ dozen oranges at 30 cents a dozen, and paid for them with a five-dollar bill. How much change should he get?

Record Sheet

Arithmetic Test

1. Our city has ...... grades in the elementary school. (State whether 8 or 9.)
2. This record is for a class in the ...... grade.
3. I certify that exactly 10 minutes were allowed for each problem, that no preparation or assistance was given to any pupil, and that the record below is a true statement of the success or failure of each pupil present at the test.

Record for each pupil, the first name to show sex, the month of birthday, the age in years at last birthday, and whether he got the correct answer in the case of each of the four problems. Sample records are shown in the first three lines.

			Problems			
Name	Birth	Age	1	2	3	4
Mary	June	12	W	W	R	R
Jane	Sept.	15	W	W	W	R
Helen	Nov.	11	W	R	R	R
Etc., etc.						

Educational Scales

We very much need a series of sets of arithmetical problems, each set containing problems of equal difficulty, and the series of sets forming a gradation, by short steps of difference, from very easy to very hard problems. It is often desirable to measure the achievement of an individual or a class or a school by how hard a problem can be solved in a given time rather than by a ' blanket ' score for the amount done of an ordinary examination task, combined somehow with its quality.

The most useful present definition of increase in ' difficulty ' of arithmetical problems for a given group of pupils is that increase whereby the percentage of pupils solving the problem decreases; and any statement of a problem's difficulty in terms of the percentage of pupils of a known age or grade solving it within a defined time (here 10 minutes) is a step toward such a graded series or scale as was mentioned above. We can, for example, use Problem 3 of the above list more intelligently, once we have found that it is such a problem as half of the pupils in grade 7 (in November) solve (with correct answer) in 10 minutes or less. So also to know that Problem 4 of the above list is solved (with correct answer) by three-quarters of pupils in grade 6 (in November, and in systems having 8 grades in the elementary school) is a useful fact and will be tenfold more useful when other similar facts are obtained and used in connection with it.

Such facts for the four problems of our list, the tests being of date Nov. 15-25, are:

PERCENTAGE OF CORRECT SOLUTIONS IN 10 MINUTES

Systems with 8 grades

	Problem 1	Problem 2	Problem 3	Problem 4
Grade 8	30.6	37.6	65.5	94.4
Grade 7	18.1	22.3	48.9	87.0
Grade 6	6.7	17.3	26.5	76.6

Systems with 9 grades

	Problem 1	Problem 2	Problem 3	Problem 4
Grade 9	41.1	60.2	83.1	96.8
Grade 8	25.6	44.3	71.8	95.5
Grade 7	13.2	22.1	55.2	93.9

By making any allowable hypothesis about the form of distribution of ability at problem-solving in each of these grades, we can express the differences in difficulty between 1 and 2, and 2 and 3, and 3 and 4 in commensurate terms. By making any allowable hypothesis concerning the difference between the difficulty of Problem 4 and zero, or 'just not any,' difficulty, we can express the difficulty of each of the problems by a simple cardinal number representing its amount of that thing, '*difficulty,*' wherein these problems differ so that fewer pupils solve 3 than 4, 2 than 3, and 1 than 2.

For example, suppose that we assume that a 7th or 8th 'grade' in these schools represents a selection of children clustering around the average ability for that grade symmetrically in approximately the manner described by the probability curve, and call "Q *dif*" that amount of increase in difficulty which would reduce the percentage of correct solutions (in 10 minutes) from 50 to 25, in a 7th or 8th grade.

Then for grades 7 and 8 in 8-grade systems, and 8 and 9 in 9-grade systems, Problem 2 is a little over 1Q *dif* harder than Problem 3, and Problem 1 is about ½Q *dif* harder than Problem 2. Problem 4 is about 1⅔Q *dif* easier than Problem 3. If we assume further that Problem 4 is somewhat over three times as far *above* zero difficulty as it is *below* the difficulty of Problem 3, we have:

The difficulty of Problem 4 = 5⅓ Q dif. approximately.
" " " 3 = 7 Q " "
" " " 2 = 8 Q " "
" " " 1 = 8½ Q " "

These results are frankly hypothetical, being given only to illustrate the method.

SEX DIFFERENCES IN PROBLEM SOLVING

Using the results of the tests described on page 496, I have measured the superiority of boys to girls of the same school grade in solving arithmetical problems. It would be sounder to compare boys with girls of the same age, using either a complete or a random selection, but the constant errors introduced by comparing those of the same grade are slight and in any case can be studied and allowed for later. They are probably such as on the whole favor the boys a trifle.

I report the facts in Table 1, and similar facts for some 1,300 children in grades 7, 8 and 9 in cities having nine-grade systems in Table 2. For those unacquainted with the significance of the quantities described as "Estimated percentages of boys reaching or exceeding the median for girls of the same grade," Figure 1 shows graphically the amount of difference when the quantity in question is 60 per cent.

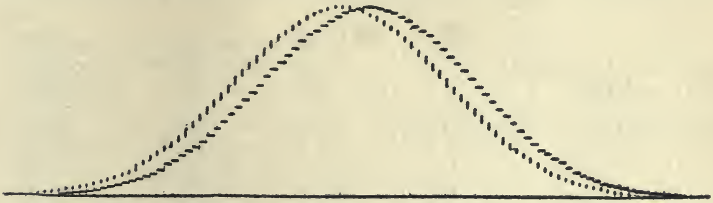

FIG. 1.—Sixty per cent. of the surface of frequency enclosed by the horizontal dash line curve reaches or exceeds the median of the surface of frequency enclosed by the vertical dash line curve.

TABLE 1

The Achievements of Boys in Solving Arithmetical Problems Compared with those of Girls of the Same Grade: in Cities with Eight Grades in the Elementary School.

		In Grade 8	In Grade 7	In Grade 6
Number of boys tested		641	452	423
" " girls "		850	537	415
Percentage of boys solving No. 1		36.2	20.6	8.7
" " girls " "		26.9	14.2	4.1
" " boys " No. 2		42.4	23.7	16.5
" " girls " "		34.5	19.0	14.5
" " boys " No. 3		73.0	49.3	30.0
" " girls " "		59.9	41.5	20.5
" " boys " No. 4		96.4	90.0	82.7
" " girls " "		94.6	82.9	72.2
Estimated percentages of boys reaching or exceeding the median achievement of girls of the same grade.	as per No. 1	60	60	65
	" No. 2	58	56	53
	" No. 3	69	58	62
	" No. 4	58	63	64

The total average estimate is that 61% of boys reach or exceed the median achievement of girls of the same school grade.

TABLE 2

The Achievements of Boys in Solving Arithmetical Problems Compared with those of Girls of the Same Grade: in Cities with Nine Grades in the Elementary School.

		In Grade 9	In Grade 8	In Grade 7
Number of boys tested		174	267	224
“ “ girls “		183	242	228
Percentage of boys solving	No. 1	57.5	31.5	17.4
“ “ girls “	“	44.8	21.9	11.4
“ “ boys “	No. 2	67.2	51.7	24.1
“ “ girls “	“	55.7	40.1	24.1
“ “ boys “	No. 3	96.0	79.4	63.4
“ “ girls “	“	86.3	78.5	60.1
“ “ boys “	No. 4	98.85	98.5	97.3
“ “ girls “	“	98.4	97.9	97.8
Estimated percentages of boys reaching or exceeding the median achievement of girls of the same grade.	as per No. 1	62	61.5	60.5
	“ No. 2	62	61.5	50
	“ No. 3	74	51	53
	“ No. 4	59	57	47

The total average estimate is that 58% of boys reach or exceed the median achievement of girls of the same school grade.

The general result—that 60 per cent of the boys reach or exceed the median for girls—is much the same as Thompson found in comparing men and women in respect to a similar test. I have also computed the sex differences in the number of problems solved correctly in the Courtis test with problems (No. 6) from the data recently published by Courtis.[1] The results are as follows: In Grade 7B, in which the difference is greatest, about 67 per cent of boys reach or exceed the median for girls. In Grades 6A, 6B, 7A, 8A and 8B the difference is less. The detailed scores are not given by Courtis, but if they were, the general result for these grades would be apparently very close to the 60% obtained in the present study. It should be added that in high-school pupils Courtis finds a much smaller difference.

The sex difference found is small in comparison with individual differences within either sex, but in comparison with the differences between one grade and the next it is considerable; for these also are small. Roughly the boys are about half as far ahead of the girls in the same grade as they are of the boys in the preceding grade.

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[1] Interim Report: Committee on School Inquiry: Board of Estimate and Apportionment. Report on the Courtis Tests in Arithmetic, pp. 137 and 138.

RETARDATION

In the discussions of the past five years concerning 'retardation'—i. e., the presence of children in grades below those where they would be had they entered grade I at six or seven and progressed one grade a year—it has often been assumed that many such pupils are held back in spite of ability to do the work of a more advanced grade as well as, or better than, the younger pupils in that advanced grade.

The contrary is probably the case, teachers and principals tending to promote the older of a group of pupils of equal ability and achievement more freely than the younger ones. This conclusion appeared probable to me years ago from the fact that in psychological tests of ability the young pupils ranked higher than the old in the same grade. It has recently been confirmed by measurements of educational achievements proper, and I shall present one sample of such studies at this time.

The educational achievement measured in this sample study was the ability to solve the four arithmetical problems of page 496, ten minutes time being allowed for each, the directions being as stated on page 495.

There was no reason for any departure from these directions, but such would not in any case act to invalidate any of the conclusions which will be drawn here. For such would not favor old more or less than young children.

If, now, we compare the achievements of young and old children in the same grade, say 11-year-olds and 16-year-olds in grade 8 of cities with eight grades in the elementary school, we find at once that in general the older the group of children is, the less well the group ranks. Thus 38.5% of these 11-year-olds solved problem 1, while only 20% of these 16-year-olds did; 52% of the 11-year-olds solved No. 2, while only 26.7% of the 16-year-olds did; 69.2% of the 11-year-olds solved No. 3 while only 56.7% of the 16-year-olds did.

I present the relevant facts in Tables 3, 4 and 5. These tables give, for each age in each grade, (1) the number of children tested, and (2) the percentage obtaining correct answers to each problem.[2]

These tables should be consulted for any exact estimate of the differences in question. As a rough means of seeing their approximate total drift at a glance, I have averaged the "Percentages correct" for the 9-year-olds in grade 6, the 10-year-olds in grade 7 and the 11-year-olds in grade 8; those for the 10-year-olds in grade 6, the 11-year-olds in grade 7 and the 12-year-olds in grade 7; and so on throughout. Comparing the younger and older pupils with those of medium age (the middle two years for each grade) we have, as average percentages correct:

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[2] Problem 4 was used only in the case of Grade 6, since it is solved correctly in ten minutes by practically all the children in grades 7 and 8.

Youngest	Next Youngest	Two middle Years	Next Oldest	Oldest
38.7	36.2	33.1	32.4	30.7

I venture to prophesy that in the 'intellectual' school subjects, such as reading, arithmetic, geography, language and history, superiority of the younger to the older pupils in the same grade will be found to be the rule. In handwriting and drawing, where age counts more, the reverse may be true. If retardation meant being held back to do less advanced work than the pupil really could do, it would be the case that the youngest pupils in any given grade would on the average be the most retarded. The prime fact is that individual differences amongst children of the same age enormously outweigh differences between the average for any one year and the average for the succeeding year.

TABLE 3

The Achievements of Children 11, 12, 13, 14, 15, and 16 Years Old in Grade 8

	11-year olds	12-year olds	13-year olds	14-year olds	15-year olds	16-year olds
Number of children tested..........	52	432	543	323	106	30
Percentage solving problem 1.......	38.5	31.3	32.0	27.6	34.0	20.0
Percentage solving problem 2.......	52.0	36.8	38.1	35.9	43.4	26.7
Percentage solving problem 3.......	69.2	69.9	65.0	62.5	60.4	56.7

TABLE 4

The Achievements of Children 10, 11, 12, 13, 14, and 15 Years Old in Grade 7

	10-year olds	11-year olds	12-year olds	13-year olds	14-year olds	15-year olds
Number of children tested..........	22	234	408	177	116	26
Percentage solving problem 1.......	22.7	21.8	19.1	9.6	11.2	19.2
Percentage solving problem 2.......	31.8	24.8	22.5	15.8	15.5	23.1
Percentage solving problem 3.......	40.9	57.3	47.5	32.8	35.3	38.5

TABLE 5

The Achievements of Children 9, 10, 11, 12, 13, and 14 Years Old in Grade 6

	9-year olds	10-year olds	11-year olds	12-year olds	13-year olds	14-year olds
Number of children tested..........	18	214	299	181	92	33
Percentage solving problem 1.......	10.5	6.1	7.7	7.2	3.3	0.0
Percentage solving problem 2.......	26.3	15.0	17.4	14.4	10.9	15.2
Percentage solving problem 3.......	36.8	23.8	28.1	22.1	26.1	18.2
Percentage solving problem 4.......	57.9	75.2	76.3	80.7	83.7	78.8

A STUDY OF FALSEHOOD

By HARRIS L. LATHAM, Presbyterian Training School, Chicago, Ill.

> Him thus intent Ithuriel with his spear
> Touched lightly; for no falsehood can endure
> Touch of celestial temper.—*Milton.*

We have various modes of presenting our discoveries; we may use poetry, narrative, scientific essay, philosophic essay, the pictorial arts and the drama. By each of these instrumentalities men have given us information on falsehood. No one of these means can be safely discarded, yet the scientist and the philosopher will be the judges in the court of final appeal.

In the work of serious analysis falsehood and truth are concepts that very readily suggest a logical treatment of the problem. Consequently in the works of the logicians will be found elaborate discussions of fallacies; Aristotle set the problems. Well-known writers on falsehood and truth include such names as Sedgwick, W. W. Johnson, J. W. Powell, C. M. Wieland, J. Watson, F. C. S. Schiller, John Fiske, J. Cook, Saint George Mivart and all of the writers of standard texts in logic.

The broader reaches of philosophy inevitably lead into the problem of falsehood. A capital instance of this is the doctrine of Maya or illusion so welcome to the philosophic mind of the East Indian. All of the phenomenal world is false; reality can be known only in nescience, on the sense plane; a universal knowledge which grasps the illusory nature of all that is not soul discovers reality in the identity of the soul with the Brahman.

In art the problem of falsehood is well recognized. Paulhan for example has discussed " Le Mensonge de l'Art " through three hundred and seventy-seven pages.

In a larger way falsehood as a constituent trait of human character and personality is treated in Paulhan's " Le Mensonge du Caractère;" his principal topics are false indifference and simulation.

The most revolutionary treatise at hand is by Max Nordau; he has written on the Conventional Deceptions of our Civilization. The German original appeared in 1883; translations into a number of the European languages have been made. On its appearance friends and foes quickly arose to share in a violent discussion. The author found himself surrounded on every side by deception and hypocrisy. We all play a part in a profoundly immoral comedy due to an almost unmitigated egoism, precipitated by the struggle for existence.

In more recent decades the psychological approach[1] to the study of falsehood has been preferred. Some of the topics already treated may be enumerated: the lie, children's lies, the lie of pathological cases, our general attitude toward truth, popular delusions, conjuring deceptions, falsity in report, make believe, illusions, the social uses of deception, the relation of imagination and falsehood.[2]

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[1] The subject of falsehood is indeed a matter of prime interest in view of the following: "Perhaps the most interesting contemporary group of thinkers in the psychic field is now challenging consciousness itself, which has so long been the oracle of philosophy, as never saying what it means, but always dealing with symbols that need laborious interpretations, the canons of which they are now attempting to evolve." G. Stanley Hall, "Educational Problems," Vol. I, p. 348.

[2] The exact titles of some of the numerous articles and books dealing with these topics are herewith transcribed: Felix-Thomas, "Le Mensonge," Revue Pedagogique, Vol. 50, pp. 509-19. Drommard, "Les Mensonge de la Vie Interieure." St. John, "A Genetic Study of Veracity," Pedagogical Seminary, Vol. XV, pp. 246-70. G. Stanley Hall, "Children's Lies," in his "Educational Problems," ch. VI (and Ped. Sem., Vol. I, pp. 211-18). Lipmann, "Einige interessante Kinderluegen," Zeitschrift fuer paedagogische Psychologie, Pathologie und Hygiene, Vol. 8, pp. 85-88. In the same journal, Vol. 7, pp. 195-201, see also Schafer, "Kommen Luegen bei Kindern vor dem vierten Jahren vor?" Guillermot, "Un cas de mensonge infantile," Archives de Psychologie, Vol. 2, p. 377. Demoor et Daniel, "Les enfants anormaux à Bruxelles," Annèe Psychologique, Vol. 7, pp. 286-313. "Rapport oral sur les mensonges d'enfants;" Bulletin de la Société Libre pour l'Etude Psychologique de l'Enfant, 1902, pp. 130-137. Oppenheim, "Why Children Lie," Popular Science Monthly, Vol. 44, pp. 382-87. Barnes, "Why Children Lie," Current Literature, Vol. 34, pp. 213-14. Richard, "Le mensonge chez la femme hystérique." Delbrueck, "Die pathologische Luege und die psychisch abnormen Schwindler." Piper, "Die pathologische Luege," Zeitschrift fuer paedagogische Psychologie, Pathologie und Hygiene, Vol. 8, pp. 1-15. Jonckhiere, "Le Mensonge chez les Arriérés," Archives de Psychologie, Vol. 2, pp. 263-66. Eisenhofer, vide "Wahrheitsgefühl" und "Wahrheitsliebe" in Rein's Encyklopaedische Handbuch der Paedagogie, Vol. 7, pp. 538-44. Chas. Mackay, "Memories of Popular Delusions." Jastrow, "Fact and Fable in Psychology." Triplett, "The Psychology of Conjuring Deceptions," American Journal of Psychology, Vol. II, pp. 439-510. The Aussage literature, as Stern's "Erinnerung, Aussage und Luege in der Ersten Kindheit" (abstract in American Journal of Psychology, Vol. XXI, pp. 270-82); Lobsien, "Aussage und Wirklichkeit bei Schulkindern," Beiträge zur Psychologie der Aussage, Vol. I, Heft 2, pp. 26-89. "Original Make-Believe Games," Pedagogical Seminary, Vol. VI, p. 317 ff.

As an example of a monographic treatment from the psychological point of view we may refer to Duprat's "Le Mensonge, Etude de Psycho-Sociologie Pathologique et Normal" (1909). The ground covered includes the description and classification of deception, deception in abnormal persons (criminals included) deception in children, deception in social life, deception in primitive and cultured societies, the psychophysiology of deception, the moral aspects of deception, deception and education.

This study was made on material gained by a questionnaire sent to school teachers to ascertain the facts as to voluntary and involuntary modifications of truth by school children. It is sane, balanced, illuminative and suggestive of further studies of a similar character.

The present writer proposes a study of falsehood from a viewpoint different from all those alluded to above. A vocabulary as nearly exhaustive as possible was collected.[3] This list of words contains the terminology, current in the English-speaking world of to-day, used to describe or denote every false relation, fact, act, idea, etc., with which we have to deal. The entries number nearly twenty-five hundred.

For facility of treatment it seems best to allow the material to fall into two groups: terms that denote general concepts; terms that represent special concepts. This distinction is not absolute, but nevertheless is sufficiently correct for our present purpose. The specialized types of action are denoted by such terms as thievery, cheating at games, treason, magic, lying, stratagem and the like; the present paper will not treat of these further.

The general terms are concerned with states of mind, consequences of acts, attributes of persons, acts and so on. These words are almost wholly indicative of an intellectual state in which falsity plays a part. They serve to describe the reaction of the individual mind to experiences in which falsity is a vital factor.

One indeed soon discovers while making this study that the facts are nearly all social facts. By far the larger part of the actions described are not performed by the agent on himself but upon another person or group of persons. And yet there is a range of mental states in which precision and definiteness to a degree are wanting, where classification of the facts has remained in general terms rather than advanced to specific ones.

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[3] Suggestions on the use of vocabularies may be drawn from the following: Westermarck, "The Origin and Development of Moral Ideas," Vol. I, ch. VI. Bréal, "Semantic." Articles in the Pedagogical Seminary: M. C. and H. Gale, "Vocabularies of Three Children," Vol. IX, pp. 4, 22-35. Chambers, "How Words Get Meaning," Vol. IX, pp. 30-50; Trettien, "Psychology of the Language Interest of Children," Vol. XI, pp. 113-77 (with bibliog.); Doran, "A Study of Vocabularies," Vol. XIV, pp. 401-38; Mateer, "The Vocabulary of a Four-Year-Old Child," Vol. XV, pp. 63-74.

To facilitate discussion the following rubrics have been selected: the act (neuter, subjective, objective); attributes of the act; the concept; attributes of the concept; the person (agent, patient); the attribute of the person. Other classifications of the data might have served the purpose as well, but the suggestion of this one came naturally out of the material and represents very largely the human interests involved in the experiences described.

It is convenient to distinguish acts which are directed essentially toward an effect to be produced in another living being from those that have a subjective goal in the person of the actor himself; both of these classes may be oftentimes demarked from a third which embraces acts that are equivocal, acts in which the person or thing that experiences the consequences of the acts is not determined. Our ordinary grammatical distinctions of transitive and intransitive are not adequate guides at this point because these distinctions are formal and do not permit the elasticity desired. For the purpose of this discussion all actions that have no specific indication of their goal whether self or other living being may be termed neuter. This class will be vigorously reduced to the minimum for the sake of economy; for it facilitates apprehension of experience to regard it from the viewpoint of its most concrete aspects rather than from its more generalized and therefore more elusive relations. Our first task then is a study of states, processes, relations expressed by terms denoting action, but not indicating specifically any person or thing as appreciably affected by the act. We postpone a discussion of the verbal falsehood as constituting a special sort of falsity.

An obsolete use of the verb *to false* as a transitive verb has the meaning to falsify, to make untrue, to introduce falsehood into something. It also means to maintain to be false. *To falsify* means to make false or incorrect, to alter fraudulently, to introduce false matter into or to give an incorrect version (of a document, etc.), to alter or pervert from the correct rule, to declare or prove false; as v. i. to make a false representation; to deal in falsehood (Obs). As a metaphor taken from a mechanical process we use *distort* as a synonym.

There is a small group of words formed with the prefix mis- that must be considered here. *Misapplication* (*to mis-*

apply) is forming wrong associations for a given truth, doctrine, or principle, attempting to place the wrong particular under a given principle or rule; this is an intellectual error in the use of a general fact or truth. Another case is a *mistake* in the selection of an object or matter; here one *mischoses* the thing selected, doubtless out of a wrong estimate of values. Not unlike this is the error of placing a given object in the wrong class or category, that is, *misclassification.*

Mathematical error is fairly considered as colorless for the most part as the notions just alluded to. One may *miscipher, miscalculate* or *miscompute.* The *miscomputation* may be affirmed without designating the direction of the consequences of the error in mathematical processes. The unique significance of the term is that it points out the fact of error in some mathematical operation and by a metaphor gives some estimate of forces in operation within the range of the observer's attention.

If the person under consideration suffers error in the matter of his volitional activities he may be said to have *misintended* when his act of will turns out to be ill-advised. The act is called a *misintention.* A *misstep* is an error in procedure; it may refer to an accident while out walking or to an erroneous decision. To *simulate* (*simulation*), (*misseeming,* Obs) connotes false assumption, feigning, pretending, suggesting falsely; or to convert into something by simulation (Obs); or to put forward deceptively (Obs. Rare); as v. i. to pretend or to feign.

Here belongs a section of the terms that denote logical error. The greater part of the general vocabulary of falsehood may be used in describing illogical procedure, but a specific list of terms has been developed. To *chicane,* to *cavil,* to *false,* to *gerrymander,* to *paralogize* (*paralogism*), to *misinfer,* (*misinference*), to *misjudge,* (*misjudgment*), to *quibble* (a *quibble*) all indicate the type of error now before us. The mildest of these terms is the misinference: with one or more premises given a wrong inference is drawn. Logically antecedent to the misinference is the misjudgment, which of course necessitates error in all processes founded upon it. To paralogize is to argue falsely; it is a highly technical term and is almost a pedantic name of a very simple fact. The paralogism is a piece of illogical reasoning, an erroneous argument, a fallacy; all of these terms are strong in that they brand the argument described in its true character.

Illegitimate logic is as often defensive as it is offensive. To cavil is to raise captious objections or to find fault without reason; to chicane is to quibble over a matter and a quibble is an equivocation of the point at issue, an evasion of the real point in the argument.

A very peculiar characterization of falsity in argument grew up from the conduct of Governor Elbridge Gerry of Connecticut, in regard to the redistribution of electoral districts for the purpose of favoring his political party. To gerrymander has since come to signify to garble and misconstrue, as the premises of an argument, so as to arrive at a forced conclusion.

A critic may witness some false act or discover a false situation; to error in such a case is to decide a thing to be erroneous (chiefly in law).

We may summarize the mental acts thus far enumerated as follows: to make untrue, to introduce falsehood into a true somewhat (document, procedure, etc.); to attempt to govern a given act or piece of procedure by unsuitable law or principle; to err in the selection of a part from a whole; to err by wrongly classifying a thing; to commit mathematical errors; to misjudge the course of events; to make a wrong decision; to mistake the proper steps in a procedure whether in bodily action or abstract projects; to attempt to duplicate qualities found in other persons; to commit a logical fallacy, to misconstrue purposely points at issue in an argument for the purpose of evasion, or to force a biased conclusion; to pronounce erroneous after examining an object.

These are fair instances of judgments in which the least possible implication appears as to an estimate of the actor or the least possible evidence of the outcome of the act upon any one within its reach. These highly refined judgments show man changing the true into the false, intermingling the true and the false, thinking false thoughts, adopting false procedure, making false decisions, recognizing false entities as true.

These descriptions differ from those yet to be presented under our heading "concept" only in this particular—these are unequivocally discriminated as actions of a person.

We now advance to a group of discriminations in which the trend of the act is directed toward a particular subject (person). The outcome of the act is reflexive, internal, subjective. Whatever consequences of the act may reach out into social groups they exist positively without presenting a clue so far as the analysis of the situation is concerned. Falsehood, error and all the allied factors then may be experienced by a single person without the active cooperation of other persons. Moreover these experiences may consist of overt acts as well as of passive states.

One's ideas, policies, theories, plans, opinions and the like may be projected into wrong directions; may embrace more or less of untruth. In such cases the person *aberrs, errs, misthinks, goes astray, wanders into error.* It is a case of *aberrance* (*aberrancy,* Obs), or *straying into a vagary,* a case of *aberration* or *deviation* from a direct, prescribed course of action whether intellectual or moral. Aberration even in a normal person may readily suggest a pathological tendency. One errs by adopting a false principle; he *blunders* in wrongly applying a principle.

The more emphatic instrumentality of the self in the committing of mistakes is seen when one *deceives or fools himself* (*self-deceit* or *self-deception*) or perchance *allows himself to be misled.* The result of all this is a *delusion* in the sense of being misled (Obs). One may be led to *believe what is false.* Two slang expressions have the same import: *to get bit* and to *get the sack,* signifying a state of deception in which one has been a contributing factor.

One often starts out well in a course of thinking and ultimately *overshoots the mark,* thus *falling into error, getting into the mists, being drawn into error* or *lying under an error.* A milder situation may arise perhaps when we merely *misappreciate* the conditions of things. This *misappreciation* depends on a *misapprehension* of the facts as presented. One *misapprehends* when he does not rightly observe, when he gains erroneous information by failure in the simplest act of recognition of a fact. If the error is more serious he may *miscomprehend* or *misunderstand* the whole situation. If narrowly intellectual it is a case of *misconception;* one may *misconceive* that which is to be realized in some future action or event. (*Misconceit,* n. and v. more rarely.) A *misinterpretation* of factors in a situation will result in a *misconjecture* as to the outcome of the acts, or series of events. Very often statements heard or facts presented may be in themselves true and correct but out of ignorance or for some other reason they are *misconstrued* and their proper import *misinterpreted.* This *misconstruction* is also described as due to *misdistinguishing* or *misknowing* the facts; more commonly we *mistake* them, through insufficient observation. We may misconstrue that from which the meaning is gathered by inference; we *misinterpret* that which is intended to express a given meaning.

If the problem relates to matter confessedly darkly understood one may despite all be constrained to attempt to *decipher* it. In this case he is apt to *misguess* the facts or to *misimagine* the elements left for conjecture. In this connection we often resort to mathematical attitudes of mind; wherever failure attends our efforts we may be guilty of *miscalculation.* If we *miscalculate* we also *misreckon* or *reckon without our host* by overlooking some determining element in the circumstance.

Typical and well recognized psychological processes are involved in these erroneous adventures of the mind. *Misrecollection* (to *misrecollect*) is due largely to a mislearning and in turn constitutes a part of *misremembering* or *misimagining* in the case of an attempt at an imaginary construction. If we misjudge matters presented to us we are said to misdeem them (Obs.).

If we ever misstate the facts it is, alas, because sometimes we *mismean* the proposition that we utter. If we are unduly credulous it is because we *misbelieve* (*misbelief*). If we hold to false opinions we are guilty of *pseudodoxy.*

Hallucination is a pathological experience in which whether a sense stimulus be present or not the patient falsely supposes he perceives objects. In the *illusion* the normal person likewise commits error in perception, but it is due to a complication of natural processes, with no disease factor present. Our interest is in the fact that both of these psychical states are well known to involve unequivocal error; this error is positively subjective in its origin, the external factors are so allocated as to furnish the appropriate stimulus.

We conclude then that a person may precipitate himself into intellectual error by allowing himself to be deceived, to err, by actually embracing error, by carrying a correct principle or policy too far, by using insufficient insight in the apprehension of facts, by remembering poorly, by intentionally perverting the facts, by wrongly perceiving objective things, or by being over credulous as to matters reported.

Our next division deals with these more narrowly intellectual processes as they reach out beyond the actor to a part of his social environment. We have considered actions that are largely colorless as to their outcome, actions that positively react on the actor; now we examine the processes that expressly modify conditions in a living being other than the actor. It is not to be assumed that any of these acts are necessarily consciously apprehended as to the element of falsity; the awareness of the presence of falsity must be affirmed only on the warrant of positive information to that effect. That is, an act may be false and work out its effect on society without being recognized as false by the perpetrator of the deed. This matter of cognizing the false factor may be determined only by the full context of the situation; this situation may be or may not be summed up in the term that describes the act in its aspect of falsity.

Even in case the falsity of the act is known to the actor the degree of this apprehension is a constantly varying factor and cannot be considered for the most part in a discussion like the present. Our concern is strictly with the fact that one person performs an act that modifies typically the state of mind of another person or group of persons, animal or group or animals, in such a manner as to introduce into this state of mind some element of error or falsity. The factor thus introduced is specifically intellectual and is therefore general in character.

Mystification is an act in which one plays upon the credulity of his victim, *throws dust in his eyes,* and so prevents him from exercising his ordinary intelligence. A state of *bewilderment* arises when one is *bamblustercated, hoodwinked, inveigled* (Obs), *mystified* and he is in a state in which he can easily be *humbugged;* he is in a *haze;* he is *mixed;* he is *blind.*

A more complex means of deception is that of *charming* a person. Here the actor *fascinates, bewitches, enchants* his victim so that he cannot exercise his normal intelligence. His capacity for usual precaution is disabled. *To feed* implies something of helplessness on the part of the victim, as he is easily deluded into the acceptance of fictitious facts. In order to describe more vividly this type of deception another metaphor is allowable, that is, to *fox,* meaning to compass and end by some crafty means. *To get it over* one is to seduce him, to fascinate him and so accomplish some nefarious design.

Deceit, to *deceive* (to *feint,* Obs), *deception* all are terms designating an action in which one conceals the truth from another in order to mislead him, causing him to believe what is false. To *hallucinate* formerly had the same meaning. A *heave* is a mere attempt at deception.

The situation is more serious when the actor *deludes* (*eludes,* Obs., *foxes,* Obs.) his victim, leading him by pretense to hold a false opinion; this act of *delusion* consists in *befooling* a person in his expectations. It is the same as to *dupe* or to *fool* or to *make a fool* of a person. It involves *pretension* (to *pretend*), that is, alleging falsely with the intent to deceive.

A very moderate form of deception consists of *simulation: falsely suggesting, putting forward deceptively* (Obs.) with the intent to deceive. A positive action takes place when one *misinforms* the one duped on some point of fact; if this is an extended process it becomes *misinstruction* (to *misinstruct*) and both necessarily involve *misrepresentation* (to *misrepresent*) or *false representation* of facts.

A more aggressive though perhaps less effective deception results from an attempt to *bluff* a person. The plan here is to *blindfold,* to *hoodwink* a victim so as to deter him from an act by a false show of opposition with a view to the achievement of some hidden purpose. Usually the actor expects some definite personal gain; he may *run a bluff* with a pretense of assurance covering real uncertainty or weakness on his part. A metaphor drawn from the kitchen is to *sweeten,* approximately denoting the same as to *stuff.* A slang expression appears in to make one *believe that the moon is made of green cheese.*

The significant difference between these other acts and *guilery* is that the latter marks out the deception as arising in the wicked nature of the actor, due to a wily regard for his own interests. To *guile* is to beguile or to deceive. Success in capturing game has yielded a term descriptive of this same act: to *gull* is to capture a person by means of a trick, to make a gull or dupe of one. A *gull* is a trick or piece of deception; *gullage* and *gullery* are alternatives of the same import.

When special pains are taken to use soft phrases or sophism the deceiver *honies* his victim. If the arts of the *juggler* are at command one can *sleight* the duped one, using craft and cunning in a piece of subtle dealing, thus producing an *illusion* in the observer's mind. A *wile* is an act of deception in which cunning artifice is employed. By so doing the deceiver *sucks* the deceived, *takes him in* and perhaps at once proceeds to greater crimes.

In an attitude of defense one may *baffle* his pursuers whether he is in physical flight or is meeting logical attacks; if a known fact when expressed is likely to harm one he may resort to *reservation* on being questioned and so deceive; he may mislead an opponent by giving him a *false scent.* A reservation is a deceptive answer or excuse (Obs. as to excuse). A similar *evasion* is to *shuffle,* making use of false pretenses or unfair *shifts,* to *conceal* the facts, to *fence,* to perpetrate a *come-off,* or to give one the *go-by.*

In brief then to deceive another is so to affect his mind as to prevent normal action of the powers of understanding, to induce an overestimate of specific values or factors, to lead into misunderstanding by means of a cunning trick, to suppress truth, to disappoint expectations, to suggest false ideas, to arouse self-regarding feelings in the victim and so render clear comprehension impossible.

We have found that false acts have been marked and named in unmistakable terms applicable to them alone. But not satisfied with this English speaking peoples have attempted to describe the falsity of conduct by designating the qualities exhibited in these acts. Substantive and adjectival expression largely cognate in etymology with the words naming actions are used to express these qualities.

While the essential significance of the judgments next to be studied may not be oftentimes appreciably different from the denotation of the action names, it will be worth while to observe what aspects of these false actions have so impressed the mind as to secure special recognition.

The development of attributive notions has permitted the marking of a false quality appearing in a slight degree in an act characterized mainly perhaps by some other quality. Action names are usually not indicative of the degree of qualities comprising an act; whereas by means of the substantive and the adjective an act obviously true in its main aspects may be described in its secondary attributes and so its falsity be accurately labelled.

Actions may be described as merely consisting of *wandering* from truth; in this case motives are not under observation and the drift of the process is impliedly poorly understood by the actor. He is preoccupied perhaps with other matters. If so the act exhibits *aberration,* an unaccountable deviation from uniform law or procedure. The act is *errorous,* the thought, opinion, conclusion is *erroneous, errorful* in so far as it is recognized by the critic as falling short of the standard employed.

Wide of the truth is another phrase expressing the same judgment, the definite consciousness of a point of divergence from the norm of the comparison; it is somewhat more emphatic than the term *untruthfulness,* though the latter is a far more scathing epithet. *Inaccuracy* suggests divergence from a known standard in some procedure, but it will describe mental acts as well.

From another point of view acts are seen to exhibit *falseness.* (Falsity, falsimony.) This connotes the antithesis to truthfulness without implying a genetic relation to it. *Aberration* is an attribute of an act; the term may also mean the process of leaving the truth for the untruth. As an attribute of an act it indicates definitely a prior relation in it to a previous fact. Falseness does not express though it does imply such a relation; it is therefore narrower in meaning and marks a more dogmatic judgment. *Falship* and *falsome* are rarer terms of the same import.

Falsity in acts with peculiar subjective reference appears as *delusion, delusoriness, delusiveness.* The deed may be described as *hallucinatory* or *illusional,* according to the specific content of the mind.

The positive effort to pervert truth is observable in actions; if so the act may be *falsidical,* suggesting what is not true, or *falsific* when the actor is making false that which he knows to be true. A similar implication underlies all the derivatives of to *deceive,* though these words may be used in describing acts of unconscious deception. A *deceptive* act is usually found to be due to a definite aim on the part of the deceiver to mislead the person with whom he deals. How largely human nature has revealed this type of falsity may be seen from the accumulation of the following list of derivatives: *deceitful, deceitous* (Obs.), *deceitfulness, deceptional, deceptious, deceptive, deceptiveness, deceptivity, deceptory.* These words are all used in describing the acts of man. They point out precisely the same qualities.

The deceptive quality of an act may be closely associated with some specific attribute of the actor. If the act shows *guile* (*guileful, guilefulness*), that is, *insidious cunning,* the guilt of the doer is plainly marked in the character of the deed. In a similar manner if the deed shows *sleightness* or a *sleight* it is said to be *sleightful* and the actor is marked as a cunning person, one skilled in artfulness.

The highly psychological features of an act are plainly alluded to in the power that one mind has over another when an act exhibits a *charmingness* or a *charm* (*charmful*). If the observer is unwilling to attribute positively this quality he may characterize the act as having a *charmlike* aspect. In like manner the whole tenor of a deed may be imitative of some other deed or show the actor assuming the characters of another person; in this case it is *simulative* or *simulatory.*

Summarizing our results as to the qualities of false actions we have found that they exhibit an undefined error as to the facts related to the actor; that falsity may reside in the positive faulty action of one's intellectual processes; there may be a mere wandering from the truth; the consequences of the act may be purposely conceived; success of the false acts may depend on the ignorance of the victim; some acts involve great power of mind of the actor over the mind of the victim; the feeling and hopes of the victim may be fundamentally affected by deception.

Some acts show merely a tendency to some sort of falsity; others show the quality clearly enough but no other aspect of the situation is indicated; again the abundance of the quality is often made known as when an adjective ending in -ful is used to describe it; the attribute may be a mere likeness to a recognized falsity of some sort; lastly the positive quality of falsity is suggested by negative terms such as untruthful.

We have now examined the methods by which we describe actions primarily intellectual that are marked by falsehood. It is to be borne in mind that we have included the more general acts, acts that may occur in any social situation or be due to any one of the countless subjective conditions which may arise in the human mind. Our interest at once suggests an immediate study of more specific types of acts but it will be more profitable to penetrate further into this same field before descending to particularities. There remains a discussion of certain concepts not otherwise provided for and the classification of persons who commit the acts already described or who share in the consequences.

Treating persons first it seems most convenient to divide them into three groups: (a) agents—those who actively perform false deeds; (b) patients—persons who receive or manifest the consequences of the false actions; (c) in whom there is no transfer of consequence from actor to patient certainly indicated. Here again other groupings of the facts are possible; but the constant interest where falsity is involved is in the dramatic situation—the doer, the deed and the consequences.

The designation of the doer is closely parallel to the description of the deed. Those who actively perform false deeds are first of all the *deceivant,* the *deceiver,* the *deceptionist,* the *deceptor,* the *falsary,* the *falser* (Obs.), the *falsificator,* the *falsifier,* the *deceptress,* the *illusor,* the *mystifier,* the *mystificator.* With the exception of the last four words these terms are interchangeable in use; the mystificator and the mystifier however designate actors who effect a more pronounced confusion in the mind of the victim than does the mere deceiver. The *bluffer* and the *charmer* make more complete preparation for the deception of their victims; the *duper* makes a dupe of them. The *guiler* acts from his own corrupt nature in deceiving another. The *tricker* or *trickster* has a ready device for misleading his victim. He differs in no considerable respect from the *hoodwink* (Obs.).

The *errorist* is a teacher of false doctrines (Obs. Rare). If the knowledge imparted to another is incorrect the giver of the information is a *misinformant* or *misinformer,* generally thought to be innocent of moral offense. A *deluder* who practices illusions is an *illusionist* or *deceptionist;* if he claims qualities or relations on false grounds he is *pretender* or *shuffler.* If he assumes the character of some one else he is a *simulator.* When pretending to be a wit he is a *flasher* or *fop* (*fopper,* Obs.); if despicably insignificant he is a *fopling.* A deluder who is frequently engaged in leading others astray is a *delusionist.*

It is to be noted that only one of the terms in this category has the feminine ending. It is too much to argue that the falsifier is only rarely a woman; it is undoubtedly true that despite the known facts woman's errors have not been grievous enough to develop a distinctive vocabulary of an appreciable size. This holds good as to the entire list of terms in the Vocabulary of Falsehood. The reason why more feminine nouns have not been brought into use is doubtless that men have taken the more active part in social affairs and so have determined the vocabulary of social relations. That we have adequate resources for discrimination in respect to sex is fully evidenced by the multiplicity of terms in use say in respect to thievery, roguery, commercial dishonesty. As a matter of fact sex lines have not entered appreciably into our judgments of falsity in human conduct.

The attributes of the agent are largely the same as those of the act. A priori we would argue that the character of the act is of course due to the character of the person. Having discussed these attributes above we present a list of terms used in describing the agent with but brief comment.

Charm, any alluring quality.
Charmful, abounding in charms.
Charmingness, power to charm.
Deceitful, full of deceit.
Deceitfulness, the quality of being deceitful.
Deceivable, having the quality or habit of deceiving, deceitful.
Deceivableness, the capacity of deceiving, deceitfulness, deceit, deceptiveness.
Deceivant, a deceiver, deceitful.
Deceptious, of the nature of or characterized by deception; that tends to deceive, mislead.
Deceptive, apt to deceive, having the character of deceiving, deceptivity.
Deceptory, apt to deceive.
Duplicity, deceitfulness.
Elusory, tending to elude, characterized by eluding.
Falsehood, (falset, Obs.), falseness, deceitfulness.
Falship (Obs.), untruthfulness, deceit.
Falsimony, falsity, falseness.
Falsome, deceitful, untrue.

Falsity, the quality or condition of being false, untruthfulness.
Figmentitious, addicted to framing figments.
Fopical, befitting a fop.
Foppery, silly affectation of elegance.
Foppish, resembling or befitting a fop.
Foppishness, character befitting a fop.
Guile, insidious cunning, deceit.
Guileful, deceitful.
Illusive, that tends to illude or deceive by unreal appearance.
Sleighty, possessed or making use of sleight or craft, crafty, subtle.
Trickish, given to or characterized by tricks or trickery.
Trickiness, trickishness, given to fraud or trickery.
Untruthfulness, the quality of falsity.
Wily, given to the use of cunning, wily devices.

The patient is one who suffers when a false deed transpires. One person acts, another is the recipient of the consequence. From the material at hand we conclude that some form of the verb is usually employed as a denominative, for the list of substantives expressly signifying the patient is small. The *hallucinator* is afflicted with hallucinations. The *delusionist* is one given up to delusions. It is not to be doubted for an instant that he may originate his delusions but he may also be led into them by another agency. A *dupe* is one who allows himself to be deceived; he is also a *fool*. A *gull* is a credulous person, easily imposed upon; if his social rank is not high he may be called a *sucker*. If the dupe is employed on a considerable undertaking he is a *tool*.

The attribute or qualities of the patient are more completely represented by special terms. They are as follows:
Deceivability, capacity of being deceived (Rare).
Deceivable, capable of being or liable to be, deceived, fallible (Rare).
Deceivableness, liability of being deceived.
Deceptibility, aptness to be deceived.
Deceptible, apt to be deceived.
Delusable, capable of being deluded, deludable.
Dupery, the condition of one who is duped.
Gullage, deception, the state of being gulled.
Hallucination, the mental condition of being deceived or mistaken, or of entertaining unfounded notions; the apparent perception by an abnormal person of an external object when no such object is present.
Hallucinatory, characterized by, pertaining to, or of the nature of, hallucination.

Illusion, the fact or condition of being deceived or deluded by appearances, when in a normal state; a mental state involving the attribution of reality to what is unreal; a false conception or idea; a deception or delusion, fancy.
Illusionable, liable to illusion.
Mystification, the condition or fact of being mystified.
Sweet, gullible, easily deceived.

We have been constrained to adopt the class " concept " in our system of rubrics for this discussion for the reason that in addition to the descriptions of acts and persons our language shows that we can note falsity in its various forms without indicating to what the quality belongs. The notion is so general that it is applicable to persons, acts, literature, situations of many sorts and so forth. In the previous discussion we have positive data showing that acts and persons are fully discriminated in respect to falsity in its many aspects. But this did not exhaust the facts at hand.

A *deception* is anything that deceives the mind with a false impression, a delusion. An *err* (Obs.) is an *error,* a *fault,* a *heresy.* An error may be a *delusion* or *trick* (Obs.) or a *mistake.* A *fallacy,* commonly reserved for logical terminology, also denotes deception, guile, trickery or a deception, a trick or deceitfulness, a delusion, an error and the condition of being in error. *Falsehood* signifies not merely an untrue statement but also an error or mistake, a piece of deception or falsification. *Falsity* is a more abstract concept than falsehood; it denotes error without implication of the conditions under which the error exists.

A *fiction* is a supposition known to be at variance with the facts, but conventionally accepted. A *figment* is a product of fictitious invention. A *fool's paradise* is a situation conceived to be fortunate when such is not the case. A *half-truth* is a proposition conveying a half or a part only of the truth. "A half truth is often a falsehood." An *illusion* is something that deceives or deludes by producing a false impression. Experience with illusions has resulted in a definite theory of the world which holds that the material world as a whole is an illusion.

Misintelligence is wrong, false, or erroneous news or information or misunderstanding of correct statements (Obs.). *Misinterpretation* is misconstruing the significance of language signs; it is due to a false impression.

A *quirk* is a trick, a piece of subtlety, a shift or evasion. A *reservation* is something kept back, a secret. A *untruism* is something obviously untrue. A *misconcept* is an erroneous concept.

An additional list of attributes will now be presented. *False* has several broad meanings of which one is important at this point. It signifies erroneous, wrong as applied to opinions, propositions, representations.

That which is productive of hallucinations is *hallucinative*. That is *illusive* which tends to illude or deceive by unreal appearances; is productive of illusion or false impression. *Misapprehensible* is applicable when the fact concerned may be misunderstood by human intelligence; if the fact can be misconceived as to the relation of its constituents it is *misconstruable,* or *misintelligible*. If the meaning may be mistaken, the fact, opinion or proposition is *misinterpretable*. If the sign or symbols, the various devices for giving information naturally fail in their effect they are *misrepresentative* and give rise as a matter of course to mistakes.

A *quirky* thing is full of quirks, shifts or tricks. If *truthless* it lacks truth or reality, it is untrue, contrary to fact or falls short of some standard of correctness. In this sense untruth and *untrueness* may have the same import. *Mock* denotes a quality imitative of a genuine attribute. *Meretricious* is applied where an object seeks high evaluation without real justifications. If *fictitious* the article or thing has only the form of reality; it is an *artificial* thing, a *bogus* entity.

In the field of logic a few broad concepts have been reserved for treatment in this connection. A *false judgment* is an opinion, thought or idea that does not agree with the facts. *Antilogic* is a false and spurious logic, a piece of vicious reasoning. When applied to duties and similar subjects it becomes *casuistry*. A *fallacy* is a piece of deceptive or misleading argument, a *sophism* or course of sophistical reasoning. The sophistical nature, the unsoundness of an argument is typically pointed out by this concept. The *pathetic fallacy* occurs when the falsification of the object results from the intrusion of the self, constituting the typical sentimental crime. If only a *fallacious* proposition is under consideration it may be called a falsehood. A *paralogism* is broadly speaking any logical fallacy; more narrowly a fallacy of which the speaker is unconscious. A *man of straw* is an artificial logical fallacy set up so that the speaker may exhibit his positive argument while overthrowing the error of the fallacy.

That is *fallacious* (*fallace, paralogic, paralogical*) which contains a fallacy and so exhibits fallaciousness, fallacity or a paralogism. At the same time falsehood or falsity, *want of conformity* to truth is apparent.

We have completed a survey of the judgments recorded in our language on the matter of intellectual falsehood. A few observations covering the whole body of facts are in order. One is early impelled to enquire as to the frequency of metaphorical expressions in this list of terms. They are surprisingly few. Ruling out primitive metaphors which have led to a very large number of new meanings that since time immemorial have been recognized as the literal significations of words, we may venture on a tentative list of metaphorical expressions taken from the data given above. The use of judgments employed in mathematical processes to describe errors of non-mathematical thinking is the first instance to be noted: miscalculate, miscompute and the like. The transfer of meaning is certainly easy and natural and is a distinct addition to the vocabulary of falsehood. A discussion of the origin of gerrymander has already pointed out its figurative use in the present connection.

All judgments resorting to variation from a pathway in which one is supposed to walk are distinctly dependent on a metaphor: misstep, err, wander and the like. Archery furnishes one term in to overshoot the mark. Misconception is taken from a race-wide experience and aptly preserves the Socratic doctrine of maieutics. Misconstruction is reminiscent of the builder. Mystification is based on one's experience in making his way through some sort of mystery. Hoodwink points to an artificial blinding of the eyes.

The well known arts of the magician and juggler furnish us with the charm and the enchantment. Hallucination and illusion are employed in a metaphorical sense as well as in the original psychological sense. The known possibilities of deceiving a person as to the actual composition of the foods of which he partakes furnishes an apt term in to feed. The habits of the fox enable us to describe neatly the cunning deceiver. Hunting has given us the gull. A cruder figure is that by which a deceiver is said to suck his victim. Purely physical movements of the body have suggested reservation, shuffle, elusory.

Wide of the truth is based on common spatial judgments. Sweet is derived from a remote analogy with the ease with which one takes in a sweet food product.

We have completed a survey of the judgments recorded in our language on the matter of intellectual falsehood. The facts show that like a poison injected into the circulation falsity has permeated to the minutest of our rational processes. While discrimination could conceivably be carried into much greater detail it is clear that with the tools available our descriptive powers may record every type of intellectual falsehood that human perspicacity may discern. The facts presented in their unvarnished state are in themselves worthy of study. Human intelligence has discovered its own weakness, has marked the pitfalls. It has branded the more serious offenders against intellectual truth and accuracy with epithets that cannot be shaken off. It has taken note of men and women who for any reason are the cause of their own errors. It distinguishes the intentional from the unintentional error. The actor is adequately labelled and the one who experiences the consequences of his skill in deception is fully described.

The falsity of careless or even of ordinary thought processes commands the larger part of the list presented; but unmistakable judgments are also in evidence showing that strictly logical argument is also vitiated by various means until in fact it may become mere sophistry.

Let us also affirm with M. Duprat: "L'étude qui précède a montré que le mensonge est un fait aisé à constater dans toutes les civilizations, dans toutes les classes de la société, à tous les âges et quel que soit le sexe. Malgré la diversité de ses formes, il peut être défini en général: un moyen de suggérer l'erreur, ce que l'on sait ou croit être l'erreur. . . . La lutte contre le mensonge est une partie de la lutte pour la moralité.[4] None of us can be satisfied with the discovery of the universality of falsehood as a mere scientific fact. At once we are hurried on to the problem of limits that each individual should place upon the encroachments of falsity in his own attitudes and acts.

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[4] Duprat, "Le Mensonge," etc., pp. 181, 184.

ONE HUNDRED JUVENILE DELINQUENTS TESTED BY THE BINET SCALE

By Rudolf Pintner
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The relation between delinquency and the mentality of the delinquent is one of the most important problems in the field of juvenile delinquency at the present moment. In its practical aspect it is of increasing importance for the correct disposition of the large numbers of children that are daily being brought before our juvenile courts, so much so that the best equipped courts are already provided with psychopathic laboratories for thorough study of the wards of the court. The success or failure of probation systems depends largely upon a proper understanding of the psychology of the delinquent. The Big Brothers and the Big Sisters ought to know the mentality of their little brothers and little sisters, if they expect success to follow their efforts. The failure of a child to make good is often due to inherent feeble-mindedness. He cannot respond as the normal child would respond and the " big brother " naturally gets discouraged without understanding the real cause of the failure.

Theoretically this question brings us face to face with the problem of moral deficiency, and raises the much discussed point as to whether moral deficiency may exist without mental defect. Is there such a thing as a delinquent who is mentally normal? On the one hand we have the writers who claim that delinquency in itself is a sign of mental inferiority, and on the other hand we have those enthusiastic social workers who believe that practically all our bad boys and girls are bad because they have not had a chance to be good; that little Tommy is a bad boy because of the miserable environment in which he has been brought up, and that if we transplant Tommy to a normal healthy environment he will prove every time to be a normal healthy boy. Both of these extreme positions seem to the writer not to be justified by the facts.

The present study[1] is based upon the results obtained from testing by the Binet-Simon Scale one hundred delinquents at the Columbus Juvenile Court. The children tested were those who, for various reasons, were held for longer or shorter periods in the Detention Home, either awaiting trial or waiting to be disposed of according to the order of the court. The charges ranged from the most trivial offences such as slight incorrigibility (throwing stones, etc.), to the more serious offences of stealing, burglary, and gross immorality. The distribution of offences is shown below under the inclusive heads of Stealing, Immorality, Incorrigibility and Truancy.

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[1] The writer wishes to acknowledge the courtesy and co-operation shown to him by the chief probation officer, Miss Virginia Murray, and to all the other officers of the court.

Offence	Boys	Girls	Total
Stealing	29	0	29
Incorrigibility	16	5	21
Immorality	3	27	30
Truancy	15	5	20
	63	37	100

The ages of the children ranged from seven to twenty. All of the children were tested by the writer himself and in no instance was any insuperable difficulty found in getting the children to answer the questions. Indeed, as has been pointed out by other workers, most of them seemed to become immediately interested, and tried to do their best. They were not only willing to answer all the questions, but were ready to tell all about their delinquencies with great frankness, often however with little regard for the truth. Reticence and truthfulness are not common characteristics of the juvenile delinquent.

Goddard's revised form of the Binet-Simon Scale was used. The Fifteen and Adult tests were made use of whenever feasible. The mental age was calculated in the usual way, except that double credit was allowed for any test accomplished correctly in the Fifteen and Adult tests. It was felt that since there are no tests for Fourteen, it might be presumed that a child answering a fifteen-year-old test correctly would have been able to answer at least one fourteen-year test, if such existed. This method was used in order to approximate a little closer to the probable real mental age of the child. It allowed a more correct computation of the number of years of retardation in each case.

In this study those children will be called normal who test 12 years or more, and also those where the amount of retardation does not exceed 1 year. Backward children are those who are retarded from 1.1 to 3 years. Feeble-minded children are those who are retarded 3.1 or more years. It should be noted that by allowing double credit for the Fifteen and Adult tests the so-called indeterminate class of children testing 11 or 11 and a fraction is avoided. Those who are able to pass some of the higher tests raise their mental age above 12, and those who are unable to do so can be classed as feeble-minded or backward. The writer is well aware that these Fifteen and Adult tests are as yet not standardized with sufficient accuracy, but they do seem of such a nature as to help out in coming to some decision in regard to the so-called indeterminate cases. The difficulty, of course, will not be definitely settled until we have properly standardized tests for the higher ages.

Of the one hundred cases only two tested above age, and in both cases by a very slight amount, i. e., +0.4 and +1.0. This is not very significant since the number of children aged 12 and below is only 23, as contrasted with 78 who are 13 and over. The number of normal children is 33, backward 21 and feeble-minded 46. Of the 46 feeble-minded 12 tested between XI and XII, 19 between X and XI, 8 between IX and X, 6 between VIII and IX, and 1 between VII and VIII. This is according to my method of calculating.

If we discard the Fifteen and Adult tests, as is often done, and count as normal those testing XI and above, and feeble-minded those X and below or more than three years retarded, we get 57 normal and backward children and 43 feeble-minded. It is more difficult to discriminate by this method of computation between the backward and the normal child, a discrimination which I believe is very desirable.

The Intelligence Quotient, which was also calculated for all the cases, has been advocated by Stern[2] and employed by Bobertag.[3] This quotient is arrived at by dividing the mental by the chronological age, and the child is considered feeble-minded if the quotient falls below .80. According to this method the percentage of feeble-minded would be 57, i. e. eleven more than by my method. It should be noted that of the eleven, which I consider normal and which according to the intelligence quotient would be considered feeble-minded, nine are chronologically 16 and over and test XII and above. By definition these are considered normal, because they have passed the XII tests, but the intelligence quotient, if applied mechanically, takes no account of this, and with increasing age demands a higher mental age. The sixteen-year-old testing 12.6 or below would be considered feeble-minded, disregarding the fact that our lack of tests above XII make it almost impossible even for the normal child to test much above 12.6. For the seventeen-year-old this upper limit of feeble-mindedness becomes 13.4; for the eighteen-year-old 14.2; for the nineteen-year-old 15 and so on. This makes the method quite inadequate so long as we have not definitely standardized tests for the higher ages, and indeed it must be added that neither Stern nor Bobertag has used the intelligence quotient with children above fifteen years of age. In fact, an intelligence quotient between .71 and .80 does not according to Stern always denote feeble-mindedness. Twenty-five per cent of his not-feeble-minded (*nicht-schwachsinnig*) come within these limits, and forty-five per cent of his doubtfully feeble-minded. On the other hand of Chotzen's[4] 236 cases not one of the normal children tests more than two years back, whereas 28 of the feeble-minded test only two years retarded. We are therefore giving a conservative estimate when we demand a retardation of more than three years. In the two other cases which by the intelligence quotient are considered feeble-minded and which I have considered only backward, we have in No. 83 a nine-year-old testing 7, or two years retarded. For children of nine and under, more than two years' retardation is considered subnormal, but in this case the child is just two years retarded. A nine-year-old by the intelligence quotient method would have to test at least 7.2 to be considered normal. The other case, No. 95, is a thirteen-year-old boy testing 10.1 or 2.9 years retarded. This amount of retardation is scarcely sufficient in a thirteen-year-old child to call for a diagnosis of feeble-mindedness. This method demands at least a mental age of 10.4 for a normal thirteen-year-old. Theoretically if we proceed to the lower limits of the scale, the intelligence quotient would consider a four-year-old testing 3.2 as feeble-minded. It seems to me then that an intelligence quotient of .80 is too high a limit for feeble-mindedness, and further that this method is totally inadequate for children of sixteen and over. Since we have no tests for the higher ages, we must define normality as being equivalent to a mentality of 11 or 12 as the case may be. Kuhlmann[5] would seem to favor the use of the intelligence quotient, and criticises such a method of determining feeble-mindedness as I have employed. But the intelligence quotient for children of fifteen and above is, as I have pointed out, practically useless, and about half of my cases belong in this category. Of course, in the higher ages the difference between the mental and the chronological age is surely by no one supposed to indicate the amount of retardation, because of our lack of higher mental tests.

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[2] Stern, W. L. Über die psychologischen Methoden der Intelligenzprüfung. Bericht über den V. Kongress für experimentelle Psychologie. Berlin, 1912.

[3] Bobertag, Otto. Über Intelligenzprüfungen. Zeitschrift für angewandte Psychologie. Band 6. 1912. p. 495 ff.

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[4] Chotzen, F. Die Intelligenzprüfungsmethode von Binet-Simon bei schwachsinnigen Kindern. Zeitschrift für angewandte Psychologie. Band 6. 1912. p. 411 ff.

[5] Kuhlmann, F. Feeblemindedness. Psychological Bulletin, XI, 6. June, 1914.

Table I gives the distribution of the children according to chronological age. The average mental age for each chronological age is given in the fifth column, and it is interesting to note that only in age sixteen does the average mental age rise above the age which we have taken to denote normality, and this is accounted for by the fact that among the sixteen-year-olds there are eight normal and only five feeble-minded. In the sixth column the average basal age is given, and in none of the groups does it rise above nine years. In the seventh column the average difference between mental and chronological age is given. This is not to be taken as denoting that amount of actual retardation with children above 15 years of age. In the eighth, ninth and tenth columns the distribution of normal, backward and feeble-minded children is shown. It should be noted that above the age of fifteen we cannot because of our lack of higher tests discriminate between the normal and the backward. Those who attain a mentality of 12 or more are all classed as normal. Without doubt many of these so-called normal children are certainly backward children. The left half of the table gives the average mental and the average basal ages for the three groups of normal, backward and feeble-minded children. It will be seen that in general the average mental age of the normals is not much above 12, but this means little in itself since we are approaching the natural limits of the scale. Only in one age does the average mental age of the feeble-minded reach 11 and that is in age eighteen, where the two feeble-minded children tested 11.7 and 10.3 respectively. The average basal age is interesting. For the normal children of fourteen and over, it is about 10 years, for the feeble-minded it is merely 8, and only in two ages, 18 and 19, does it just manage to reach nine.

The results show about 46 per cent of the children feeble-minded. This percentage is interesting in view of other work done in this state with much the same class of children. Renz[6] found 58 cases of feeble-mindedness out of one hundred cases tested at the Girls' Industrial Home. Similarly at the Boys'

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[6] Renz, Emilie. A Study of the Intelligence of Delinquents. Training School, May, 1914.

Industrial School about 45 per cent were found to be feeble-minded when tested by other workers.[7] Miss Alice E. Beekman, a student of the writer, tested a class of 38 truant boys and found 44 per cent to be feeble-minded. The truant class is eminently the one from which a large number of our juvenile delinquents is recruited. The close agreement of these percentages by four independent workers is, I believe, worthy of note. It would seem to point conclusively to the fact that between 40 to 50 per cent of our juvenile delinquents are without a doubt feeble-minded. It is very probably their lack of mentality that is one of the great causes of their drifting into delinquency. In this connection it is interesting to compare the results obtained with 48 dependents, who were tested by me in the Juvenile Home, while being detained there until they could be disposed of or until their home conditions could be satisfactorily adjusted. Only about 23 per cent of these children belonged to the feeble-minded class.

Table II shows the same data for the dependents as Table I shows for the delinquents. No feeble-minded children below the age of eleven were found. It is merely a coincidence that all the seven fifteen-year-olds were feeble-minded. The basal age for the feeble-minded above the age of twelve is about 7 or 8, as was the case with the delinquents. The chief characteristic of this group of dependent children is their backwardness. The dependent child seems to be a backward child rather than a feeble-minded child. It is interesting to note that two children tested more than one year above their age. Not one of the hundred delinquents tested more than one year above age. The percentage of feeble-mindedness is, of course, much higher than what would be found among the ordinary school population, but it is only half the percentage of the delinquents. A still lower percentage was found in tests given to fifty children at a children's home by one of my students, Miss Mabel Rodebaugh. Only twelve per cent of this number were found to be definitely feeble-minded. Here again the backward child predominated (48 per cent). Four per cent tested more than one year above age.

It would seem then that poverty and neglect do not necessarily pave the way towards delinquency. It is the low mentality of the child that in half the cases at least makes it unable to resist the temptations which a large city brings in its way. The bad boy is not a clever boy. He is as a rule decidedly stupid. Occasionally we may find a bad boy or an immoral girl, who is intellectually bright and who is persistently delinquent. But these cases are rare. By persistently I mean those cases in which a change to a better environment seems to have little or no effect. It would be simple and encouraging if we could account for all delinquency either by bad environment on the one hand, or by feeble-mindedness on the other. The latter we could treat in our special courts and institutions and the former would be left for our social workers to provide for. I am afraid, however, that the problem of juvenile delinquency is not quite so simple. There seems to be yet another class of bad boys and bad girls of normal intelligence whose environment does not seem to be the cause of their anti-social acts. This class I would call the moral defective, a class possessing normal intelligence but abnormal moral reactions. This is not to be confused with the so-called moral imbecile as defined by the English Mental Deficiency Act of 1913, for here we have moral deficiency merely superadded to mental deficiency. The moral defective, who is not mentally defective, I regard as the child who fails to react in the customary social manner even although he has sufficient intelligence to know how to react and to understand the consequences of his anti-social reactions. There is the child who takes a delight in stealing, who has a motive for stealing, who understands the wrong nature of his actions and who yet persists in them, the girl who is sexually immoral, who understands perfectly the stigma that attaches to such acts, who knows the dangers of such a life, and yet deliberately and without any feeling of shame chooses to continue, even although other opportunities may be held out for her. It would seem to me very desirable to have tests for this moral defectiveness, if such could be arrived at.

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[7] Results not published according to the writer's knowledge.

In regard to the results of other workers, we may note that Gifford and Goddard[8] found 60 feeble-minded out of one hundred delinquents in the Juvenile Court at Newark, N. J. Goddard and Hill[9] found 52 feeble-minded out of 54 girls, who had been inmates of a girls' reformatory but were then on probation. This last percentage is extremely high, due doubtless to the very select group of individuals tested. Goddard[10] found 66 per cent feeble-minded in an examination of one hundred juvenile court cases. Sullivan[11] tested 109 female prisoners at Holloway Jail, and found their mental level extremely low. He does not, however, give any percentage for feeble-mindedness found among them. He does not think that a low mentality is of such supreme importance in the genesis of crime as is often suggested. Some of the professional criminals are, he says, of sufficiently high mentality. Of course this cannot be denied and agrees with what the writer himself found in regard to some of the juvenile delinquents tested. But, to repeat, these are certainly the exceptions and not the rule. Gruhle is quoted by Tredgold[12] as saying that 55 per cent of juvenile delinquents are psychically abnormal and 19 per cent definitely imbecile. Again Parker Wilson of Pentonville Prison in testifying before the British Royal Commission estimated that 40 per cent of the juvenile criminals were feeble-minded. Even Morrison in 1897, before he had the advantage of definite tests, estimated that "at least a third of these juveniles are below the average healthy standard in general mental power."[13] There are, of course, writers who dissent from this view, notably Travis,[14] who says that 90 per cent and probably 98 per cent of them are normal children. It is significant, however, that this opinion is not based upon any specific tests. It seems to be a mere opinion of the writer in question, and nowhere does he define what he means by normal.

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[8] Gifford, E. G. and Goddard, H. H. Defective Children in the Juvenile Court. The Training School, Vol. VIII, 9. Jan., 1912.

[9] Goddard, H. H. and Hill, H. F. Delinquent Girls tested by the Binet Scale. The Training School. June, 1911.

[10] Goddard, H. H. The Responsibility of Children in the Juvenile Court. J. of Crim. Law and Criminol. 1912. 3.

[11] Sullivan. Niveau Intellectuel de Délinquentes. L'Année Psychologique. t. 18. 1912. p. 341.

On the whole then it is surprising how the results from different workers in different countries obtained by different methods agree in their estimation of the amount of feeble-mindedness among our juvenile delinquents. Each new study that appears seems to emphasize once again this fact, that about half of our bad boys and girls are bad, because they have not sufficient mentality to keep out of trouble. They drift into delinquency. This drifting is characteristic of the group. "Why did you steal that coat?" "I don't know." "Did you need it?" "No." "Can you wear it?" "No, it's far too big." "Then why did you take it?" "Oh, 'cause big Tom Wilson told me to take it." This is the kind of stupid delinquency that is typical of the children in our juvenile courts. It is this appalling mass of stupidity and low mentality that clogs the machinery of juvenile courts and reformatories, and makes the work seem at times so hopeless. I am convinced that until we recognize this and are prepared to deal with it in a suitable manner, we shall not stop the incessant procession of repeaters before the juvenile tribunal.

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[12] Tredgold. Mental Deficiency. Second Edition. 1914. p. 30.
[13] Morrison. Juvenile Offenders. N. Y., 1897. p. 107.
[14] Travis. The Young Malefactor. p. 20.

Age	Total No.	No. of Boys	No. of Girls	Average Mental Age	Average Basal Age	Average Difference	Normal	Backward	Feeble-minded	Average Mental Age N	Average Mental Age B	Average Mental Age F	Average Basal Age N	Average Basal Age B	Average Basal Age F
7	1	1	0	6.2	4	0.8	1	0	0	6.2	....	....	4	....	....
8	0	0	0	0	0	0	0	0	0	.....	....	....	.....	....	....
9	5	4	1	8.04	6.20	.96	3	2	0	8.53	7.30	....	7.33	4.5	....
10	4	3	1	9.75	6.75	.25	3	1	0	10.07	8.80	....	7.33	5.00	....
11	3	2	1	8.7	7.00	2.30	0	2	1	.....	9.55	7.00	8.00	5.00	....
12	9	9	0	10.18	7.88	1.82	3	3	3	11.50	10.20	8.83	8.66	8.33	6.66
13	12	11	1	10.35	8.25	2.65	1	7	4	12.60	10.90	8.82	9.00	9.14	6.5
14	17	14	3	11.20	9.18	2.80	4	6	7	12.37	11.78	10.03	9.75	10.00	8.14
15	13	9	4	10.98	8.85	4.02	3	0	10	12.47	....	10.54	10.33	....	8.40
16	13	4	9	12.11	9.69	3.89	8	0	5	13.03	....	10.62	10.50	....	8.40
17	17	6	11	11.58	9.41	5.42	6	0	11	12.72	....	10.96	10.50	....	8.82
18	3	0	3	11.60	9.33	6.40	1	0	2	12.80	....	11.00	10.00	....	9.00
19	1	0	1	10.90	9.00	8.10	0	0	1	.....	....	10.90	.....	....	9.00
20	2	0	2	10.40	8.50	9.60	0	0	2	.....	....	10.40	.....	....	8.50
Totals	100	63	37				33	21	46						

TABLE II. DEPENDENTS

Age	Total No.	No. of Boys	No. of Girls	Average Mental Age	Average Basal Age	Average Difference	Normal	Backward	Feeble-minded	Average Mental Age N	Average Mental Age B	Average Mental Age F	Average Basal Age N	Average Basal Age B	Average Basal Age F
3	1	1	..	3.6	3	+0.60	1	..	..	3.6	....	....	3	....	....
4	..	..	..	....	....	....	..	..	..	.....	....	....	.....	....	....
5	4	4	..	4.55	3.25	—0.45	4	..	..	4.55	....	....	3.25	....	....
6	3	..	3	5.47	4.00	—0.53	2	1	..	6.20	4.00	....	4.50	4.00	....
7	3	1	2	5.90	4.67	—1.10	1	2	..	7.20	5.25	....	6.00	4.00	....
8	3	1	2	7.93	6.33	—0.06	2	1	..	8.90	6.00	....	7.50	4.00	....
9	6	4	2	7.97	6.00	—1.03	2	4	..	9.30	7.30	....	7.00	5.50	....
10	4	2	2	8.85	7.00	—0.90	1	3	..	11.00	8.13	....	9.00	6.33	....
11	3	..	3	9.27	7.67	—1.73	..	3	..	....	9.27	....	.....	7.67	....
12	2	2	..	8.60	6.50	—3.40	..	1	1	.....	9.40	7.80	.....	8.00	5.00
13	6	2	4	10.60	8.67	—2.40	..	4	2	.....	11.25	9.30	.....	9.25	7.50
14	4	4	..	10.85	8.75	—3.15	..	3	1	.....	11.30	9.50	.....	9.00	8.00
15	7	3	4	10.44	7.71	—4.56	..	..	7	.....	....	10.44	.....	....	7.71
16	1	..	1	12.00	10.00	—4.00	1	..	..	12.00	....	....	10.00	....	....
17	1	..	1	12.20	9.00	—4.80	1	..	..	12.20	....	....	9.00	....	....
Totals	48	24	24				15	22	11						

A SURVEY OF ENTRANCE REQUIREMENTS AND RECENT TENDENCIES IN THE COURSES OF STUDY OF THE NORMAL SCHOOLS OF THE UNITED STATES

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The study here made is based upon data gathered, for the most part, from the catalogues of last year sent out by one hundred and eighteen state normal schools representing forty-four different states. Only schools for the whites are included, hence several schools in Southern states are not represented in the study. To simplify the task, both city and county normal or training schools are excluded from the survey. While obviously incomplete, the study is comprehensive enough to give a fairly accurate notion of the courses of study in their more general outlines, and the conditions of admission in the normal schools of the United States today.

No attempt is made to study the strictly professional phases of the normal schools' work. Other studies have been made recently, showing the present status of that important phase of their work.[1] It may be added in passing, however, that even the most cursory reading of the courses of study found in the catalogues reveals the most widespread differences of opinion among normal schools as to the value and amount of professional training required in the traditional psychological and pedagogical curricula. One western normal school trains its embryo teachers wholly in its training school, without giving psychology, principles, methods or history of education as a back-ground. Other schools require the completion of courses of all degrees of elaborateness and extent as a preparation for the practice teaching in the Model School. The lack of norms, universally accepted, in the traditional professional subjects is everywhere apparent. Below is given a complete list of the schools studied.

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[1] See "A Study of Professional Work As Presented in the State Normal Schools of the U. S.," by W. H. Sanders, in *Ped. Sem.*, March, 1913, pp. 48-57.

State. City in which school is located.

Alabama: Jacksonville; Troy.
Arkansas: Conway.
California: Chico; Los Angeles; San Diego; San Francisco; San Jose.
Colorado: Greeley.
Connecticut: Danbury; New Haven; Willimantic.
Georgia: Athens; Valdosta.
Idaho: Albion; Lewiston.
Illinois: Carbondale; Charleston; DeKalb; Macomb; Normal.
Indiana: Terre Haute.
Iowa: Cedar Falls.
Kansas: Emporia; Hays.
Kentucky: Bowling Green; Richmond.
Louisiana: Natchitoches.
Maine: Castine; Farmington; Presque Isle.
Maryland: Baltimore; Frostburg.
Massachusetts: Fitchburg; Hyannis; Lowell; North Adams; Salem; Westfield; Worcester.
Michigan: Kalamazoo; Marquette; Mount Pleasant.
Minnesota: Duluth; Mankato; Moorhead; St. Cloud; Winona.
Mississippi: Hattiesburg.
Missouri: Cape Girardeau; Kirksville; Springfield; Warrensburg.
Nebraska: Chadron; Kearney; Peru; Wayne.
New Hampshire: Keene; Plymouth.
New Jersey: Montclair; Trenton.
New Mexico: Las Vegas; Silver City.
New York: Brockport; Buffalo; Geneseo; Oneonta; Oswego; Rochester.
North Carolina: Greenville; Greensboro.
North Dakota: Mayville; Valley City.
Ohio: Athens; Oxford; Kent.
Oklahoma: Ada; Alva; Durant; Tahlequah; Weatherford.
Oregon: Monmouth.
Pennsylvania: Bloomsburg; California; East Stroudsburg; Kutztown; Lockhaven; Mansfield; Millersville; Shippensburg; Slippery Rock.
Rhode Island: Providence.
South Carolina: Rockhill.
South Dakota: Aberdeen; Spearfish; Springfield.
Tennessee: Murfreesboro.
Texas: Canyon City; Denton; Huntsville.
Utah: Cedar City.

State. City in which school is located.

Vermont: Castleton; Johnson.
Virginia: Fredericksburg; Harrisonburg.
Washington: Bellingham; Cheney; Ellensburg.
West Virginia: Athens; West Liberty.
Wisconsin: La Crosse; Milwaukee; Oshkosh; Platteville; River Falls; Stevens Point; Superior; Whitewater.

Age Requirements

The minimum age at which students are admitted into the state normal schools varies from fifteen years for both men and women, the lowest age standard imposed, to eighteen years for men, the highest standard mentioned. The Terre Haute, Indiana, school has long held to the latter standard for men, admitting women at sixteen. It is alone in this requirement for men. Eleven schools admit women at sixteen and men at seventeen years; eleven admit both men and women at seventeen; one sets up a standard of sixteen and a half years for men and women; and thirty-four admit men and women at sixteen years. Three schools name fifteen as the minimum for women, and sixteen for men; while eleven admit both sexes at fifteen. Forty schools, or approximately one-third of the whole number studied, specify no minimum age limit. A few of these forty admit only high school graduates, but by far the greater number of them have courses entered by young and immature children from the eighth grade of public schools. One may well raise a question as to the capacity of the average fifteen-year-old boy or girl to profit by the teachers' training courses entered at that age. Certainly many observers are convinced that scores of young people are relatively inefficient as teachers, not so much because they were not well trained, as because they were too immature and too innocent of books and life-experiences to profit by the instruction received. Their very immaturity makes them immune to the most helpful principles and precepts to which they are exposed. One must live a while to get the "apperceiving mass" that makes appreciation, interpretation and assimilation of much needed professional teaching a possibility.

Health

That teaching is coming to be recognized as no sinecure for the physically unfortunate, and that the work of the teacher is known to be arduous, making heavy drains upon her store of vitality, is clearly shown by the catalogue statements concerning health requirements for admission. As teaching be-

TABLE AND GRAPHS
SHOWING AGE AT ENTRANCE

AGE	1	2	3	4	5	6	7	8	9	10		12		14		16		18		20		22		24		26		28		30		32		34		36		38		40
16 W, 18 M	X																																							
17 M and W	X	X	X	X	X	X	X	X	X	X	X																													
16 M and W	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X						
17 M, 16 W	X	X	X	X	X	X	X	X	X	X	X																													
16½ M and W	X																																							
15 M, 16 W	X	X	X																																					
15 M and W	X	X	X	X	X	X	X	X	X	X	X																													
No Age Limit	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X	X

comes more and more a real profession, there will doubtless be a growth in the tendency towards a survival of the fittest, physically, in the teachers' ranks. Candidates for admission into a normal school sometimes present physicians' certificates stating that the candidate, for physical reasons, must be excused from the work of the school in physical training under the director. The reply of some schools is, in effect, "If you are too weak to take physical culture you are physically unfit to become a teacher." Many schools are trying to reach the public with cautions against those who are not strong entering the normal school or the teaching profession. Such a course on the part of the school pursuing it is a distinct public service, worthy of emulation by all of them.

The eight normal schools of Wisconsin exclude candidates for admission, if they are "suffering from active goitre, valvular heart trouble, tuberculosis in any form, excessive limping gait, extreme spinal deformity, epilepsy, paralysis, convulsions." A physician employed by the Board of Regents divides her time amongst the eight schools and works with the physical directors to improve the health condition of the students. Four other schools—Greensboro, N. C., Providence, R. I., Greenville, N. C., and Cheney, Wash., employ school physicians who visit the school and make inspections daily. Through replies to a questionnaire sent out to the public normal schools of the United States in 1911, Mr. Arthur Heche, of Stanford University, learned that "25 schools have medical inspection" and six others were "making efforts in that direction." Rochester, N. Y., North Adams, Mass., and Los Angeles require entering students to pass a satisfactory physical examination. Parents must certify that students are in good health and free from communicable diseases before the Trenton, N. J., school will receive them. Winona, Minn., Conway, Ark., Oneonta, N. Y., and Fitchburg, Mass., demand a certificate of health signed by the superintendent or principal of schools from which the student comes. Similar certificates, but signed by physicians are required by at least seventeen of the normal schools of the country. Sixteen schools mention good health as a requirement for admission, but make no mention of a certificate of health being needed to gain admission for the student. Roark found just "nine states in which health is one of the conditions of admission" in 1906. A long stride has been taken since then in spite of the fact that just sixty of the schools studied fail to mention health as a requisite, though some of that number doubtless assume it and deny admission to the physically unfit. There is nothing in the catalogue statements, however, that can show whether the rules concerning health of entering students in any case are strictly adhered to or not, though the tendency is clearly to raise the health standard both before and after admission.

Moral Character

Twenty-two schools state that only students of good moral character will be admitted, while thirty-five others require students to "furnish satisfactory evidence of good moral character," usually in the form of a certificate signed by a minister, high school principal, or county superintendent. Half of the catalogues make no reference to the character of candidates for admission. This omission is of course not to be interpreted as meaning that these schools are not concerned about the character of their students, nor even that they are less concerned than the schools which do refer to it. But since the development of moral character is one of the great tasks of the teacher, and since the possession of such a character is a *sine qua non* in the performance of her daily tasks, it is a matter of surprise that the subject is overlooked in so many instances. The wonder is greater when one recalls the increased attention that has been given to the matter of moral education in many quarters within the last five years.

The important matter, after all, is for the school promptly to dismiss students found to be immoral. This many schools do, though again it happens that a desire for numbers may cause those in authority to wink at breaches of ethical conduct, or to keep equivocal cases from a real or feigned desire to reform them.

Pledge to Teach

In about two-thirds of the schools the student is required to sign a pledge to teach, in compensation to the state for the free tuition that is given her. Twenty-one schools specify that the teaching shall be done within the state for a period of two years after graduation. Three require but one year's teaching,. while one, Hattiesburg, Miss., exacts a promise to teach for three years. Many of the schools include a clause in the pledge in which the student promises to pay tuition, and in some cases, tuition and interest thereon, if she fails to redeem her pledge. Plymouth, N. H., warns the unfaithful that she is "liable to revocation of (her) diploma and state certificate and a doom of one hundred dollars," if the pledge is broken.

More than forty schools require a pledge without specifying the length of time the student must teach, though seven of this number state that the student must promise to teach "a period equal to the length of time spent in the normal school."

Approximately one-third require no pledge. The greater number of these cases is confined to sections of the country where high schools are not within easy reach of every elementary school graduate. This may help to explain the absence of a pledge in Alabama, Idaho, Kentucky, Nebraska, New Mexico, North Dakota, Oklahoma, Texas and Washington. The state evidently feels, in such cases, that it is under a special obligation to open the doors of its normal schools to any one who is ambitious for an education, regardless of the future use to be made of it. But it seems pertinent to inquire, indeed, why one should pledge herself to teach at all, in any case? The state requires no such pledge of its farmers, its lawyers or its doctors in schools for their professional training, though doubtless much of the instruction given in such schools proves to be as much of an economic loss to the state when given to other than future workers in those professions, as the professional work in the normal schools is when given to those who do not teach—more, indeed today, because the distinctly professional phases of the normal school curriculum, —psychology, child study, principles of education, kindergarten training and story-telling, are hardly less essential to the future mother than to the future teacher.

Academic Requirements

A study of the scholastic requirements for admission into the normal schools exhibits the greatest diversity of standards, though in the midst of all the diversity there is abundant evidence of an approach towards a common standard, the college standard, *i. e.*, graduation from a standard high school with a four-year course, as a minimum entrance requirement. In his Report, 1911, vol. I, p. 10, the U. S. Commissioner of Education says: "There is a rapidly growing conviction that the entrance requirements for the normal schools should not be lower than that for college. * * * The conditions in some parts of the country, however, do not yet warrant this change, but the time is rapidly approaching when this requirement ought to prevail in every state." In the same report, p. 100, the Commissioner says: "There is always a possibility that state normal schools may be made so effective as to defeat the very purpose of their creation, which is to train teachers for schools outside the cities." These two statements from Mr. Claxton seem to represent, first, the ideal which the normal schools must keep before them and towards which they are rapidly approaching; and second, the caution necessary to keep them from setting up higher entrance requirements in any given community than the community ideals and the legal scholastic standards for teachers will permit. In other words, while the normal schools ought to be leaders in the creation of public educational sentiment, and educational standards, they dare not set up standards for entrance too far in advance of the legal and popular standards of a community, or they will find themselves without pupils, while teachers begin their work without any normal training whatever. Higher legal requirements for teachers, and higher entrance requirements for the normal schools must come simultaneously to be most productive of good.

Now this study very soon made it apparent that scholastic requirements for admission cannot be considered, in the case of the normal schools, apart from courses of study, for in a given school there may be a course open only to college graduates, and still another to which even eighth grade graduates are admitted. Or, more extreme still, many catalogues, after enumerating the entrance requirements for the various courses, expressly state that correspondence with the president will probably secure the admission of a candidate, even if he belongs to none of the eligible classes. Indeed, there are six schools at present, if one may judge from the courses outlined in their catalogues, that do maintain courses of study for elementary school graduates and college graduates at the same time. However, they can scarcely be blamed more for this than can a college or university which maintains preparatory classes and graduate courses at the same time. In fact, the very glory of one of our greatest state universities is that it reaches out and down and suits its courses to the needs of all the people. It confers its academic honors upon those only who have entered by the regulation doors, but it holds itself in readiness, and in duty bound, to help any one who wishes anything it has to give. This, by the way, seems to be the status of the great rank and file of normal schools today, though in some circles the very policy which when pursued by a college or university arouses admiration, brings denunciation when pursued by a normal school.

But it is clear that the normal school courses are not yet wholly standardized. The academic entrance requirements are therefore not standardized. They cannot be while communities differ so much in their legal requirements for teachers. So long as a state has a considerable number of teachers legally entitled to teach without the necessity of first graduating from high school, just so long will it be worth while for some of the normal schools of that state to open their doors to teachers of experience, and teachers who have begun teaching with only one, two, three or no years of high school training, that they may get additional preparation for their work. Some normal schools will long need to keep an open door for the teachers of lowest scholastic preparation that will legally admit one into the teaching profession.

COURSE OF STUDY FOR HIGH SCHOOL GRADUATES

A survey of the various courses in the normal schools shows that eighty-seven different schools outline two-year courses to which only high school graduates from standard schools maintaining four-year courses of study, are admitted. One school, Providence, R. I., has a two and one-half-year course for high school graduates, while the corresponding course in Indiana's only state normal school and Kirksville, Mo., Macomb, Ill., and Bellingham, Wash., is three years in length. This is the highest standard set in requirement for a life certificate to teach, since the eighty-seven schools referred to above issue such certificate after the completion of their courses two years long.

In the same list of eighty-seven there are seventeen normal schools with courses of three years, into which graduates of non-accredited high schools enter and fifteen with four-year courses for students who have graduated from high schools having three-year courses, and academic years of only six or seven months each.

In addition to the general two-year courses for graduates of standard high schools, many of the normal schools schedule special courses of the same length and with the same entrance requirements, but designed to train teachers or supervisors of special subjects like music, drawing, agriculture, etc. These courses are usually adaptations of the general courses, made by prescribing two years of continuous work in the subject giving name to the course, while dropping a corresponding total amount of some other subject or subjects taken in the general course. The number and name of such special courses is shown in the following summary:

27 schools have 2-year Kindergarten courses.
1 school has a 2½-year Kindergarten course.
1 school has a 3-year Kindergarten course.
17 schools have 2-year Domestic Science courses.
2 schools have 3-year Domestic Science courses.
2 schools have 4-year Domestic Science courses.
15 schools have 2-year Manual Training courses.

5 schools have 3-year Manual Training courses.
10 schools have 2-year Public School Music courses.
3 schools have 3-year Public School Music courses.
9 schools have 2-year Drawing courses.
4 schools have 3-year Drawing courses.
6 schools have 2-year Agriculture courses.
1 school has a 3-year Agriculture course.
5 schools have 2-year Commercial courses.
3 schools have 3-year Commercial courses.
3 schools have 2-year Physical Culture courses.
1 school has a 3-year Physical Culture course.
1 school has a 3-year Fine and Applied Arts course.

The 8 Wisconsin schools have 2-year College courses articulating with the junior year of the state university and running parallel where not identical with the 2-year normal school courses.

At least ten schools in Iowa, Indiana, Kansas, Missouri, Nebraska and South Carolina have four-year college courses leading to the B. A. degree in Education. Twenty-two schools report one-year professional courses open only to college graduates and leading to no degree, while three others report similar courses for college graduates, leading to the degree B. Pd.. The normal schools of California, Indiana, New York, New Jersey and the New England States and three in Wisconsin seem to be the only ones for entering which students must be standard high school graduates, or of equivalent scholarship.

COURSES OF STUDY FOR EIGHTH GRADE GRADUATES

The following table shows the distribution of courses found in the normal schools for graduates of the elementary schools:

1 school has a 1½-year course.
4 schools have 3-year courses.
25 schools have 4-year courses.
15 schools have 5-year courses.
7 schools have 6-year courses.

Graduates of the 5-year and the 6-year courses in most instances receive the life certificate to teach. Graduates of the shorter courses receive certificates that are limited, and valid for periods of years more or less nearly commensurate with the length of the course pursued. The tendency is to discontinue the short general courses having low entrance requirements, as Wisconsin has recently done with its elementary course of two and one-half years in the eight schools.

COURSES OF STUDY FOR RURAL SCHOOL TEACHERS

Though state normal schools may have been established primarily "to train teachers for schools outside the cities," it is very evident to any one familiar with the facts that in many states, if not in most of them, very few students who *graduate* from the life certificate courses ever teach again in country schools. The following paragraph by Prof. Joseph M. Gwinn, in Education, Vol. 28, p. 235, is significant:

"Information on whether normal graduates are finding employment in rural schools, obtained from twenty-four schools, show that of the one thousand eight hundred forty-eight graduates in 1906, but 23 per cent of those are teaching in rural schools. If five schools in the list, representing California, Minnesota and Pennsylvania, be omitted, there are but 6 per cent of the graduates teaching in rural schools."

In a recent paper read before the N. E. A., Pres. Hayes, of the Peru, Neb., State Normal School, reports that "Out of one hundred and seventy-three graduates in 1911, thirty-nine secured positions in city high schools, one hundred twenty-seven in the grades of town schools, five remained in the normal for post-graduate work and two took rural school positions."

In the LaCrosse, Wis., Normal School, out of a class of ninety-five students graduating last year from the life certificate courses, one went into a rural school to teach. And so, if accurate information were collected from all of the normal schools, there would be overwhelming evidence to show that in most sections of the country, the country schools are not taught by normal school graduates. For the most part teachers in the rural schools fall into the following classes: 1st, large numbers without any professional training whatever; 2d, teachers who have had some professional training in high school, or county training schools; 3d, those who have completed the shorter general courses in the normal schools; and 4th, those who have but partially completed the standardized normal school courses and then dropped out to earn the money with which to continue or conclude their normal school work. Full course graduates, as has been shown, go to the city schools for obvious reasons,—better salaries, better cultural advantages, more companionship, graded work, closer supervision, etc. The country schools have long been cheated out of their birthright.

The present nation-wide interest in a better rural institutional life has taken hold of the normal schools. They are endeavoring to make a contribution to the solution of rural problems, and doing it in two ways: 1st, by the enrichment of old courses of study with electives, or new required subjects, that may tend to interest the student in country schools and country life; and 2d, by arranging shorter courses of study, with lower entrance requirements, that shall be especially suited to the sociological needs of country teachers. To this end twenty-four schools have already established rural school courses. To enter these courses, in some states at least, there must be not only an implied wish to teach school, but a signed pledge to teach *country* schools. They have developed most fully in such agricultural states of the South and West, as Alabama, Idaho, Ohio, Kentucky, Michigan, Missouri, North Carolina, North Dakota, Louisiana, Virginia and Wisconsin. In a few schools, as in Kalamazoo, Michigan and LaCrosse, Wisconsin, the rural school courses are coordinated and presided over by one man known as Head or Director of the Rural School Department.

In most instances the academic requirements for admission into these courses are low. At least eighteen of the normals admit eighth-grade graduates into these courses which are usually two years in length. Brockport, N. Y., Mayville, N. Dak., and Mt. Pleasant, Mich., have separate courses one year in length for high school graduates. Kalamazoo, Mich., has a similar course but a summer term longer, while Cheney and Bellingham, Wash., have two-year courses for high school graduates.

There is a considerable degree of uniformity in the rural school courses of study the country over. Agriculture, nature study, such phases of manual training and household arts as can be presented in the country schools where there is scant equipment and no special teacher, are generally found. The traditional "common branches" are reviewed, with emphasis upon methods of teaching them, and with attention to such modifications and elimination of subject-matter as make them best suited to rural conditions. Arithmetic, perhaps, lends itself most readily to adaptations suited especially to the farm, as is best illustrated by the problems included in Jessie Field's little book, "The Corn Lady," the "community arithmetic" used in the Indianapolis public schools, and the exceedingly practical arithmetic filled with problems growing out of the life-experiences of students, used in the Tuskeegee Institute.

Language and Composition courses permit the same sort of adaptations to rural needs through a wise selection of themes for oral and written work, and intelligent direction of the reading that is involved in the course. Geography, too, becomes largely industrial, with the emphasis upon such foreign topics only as have most vital connections with the home regions. Similarly, nature study and every bit of science offered in some of the rural courses is given a practical rural bent in its applications. Then there is a special adaptation of school management to rural school conditions, where problems of seating, heating, lighting, ventilation, sanitation, decoration, program making, discipline, play, entertainment, study and recitation, all differ somewhat radically from the corresponding problems in the city.

High school subjects are included in the courses of study to a limited extent only. The brevity of the courses will permit but few subjects, and no extended treatment of these. However, music, drawing, and some high school English find a place in these courses, though there is less uniformity of practice in regard to algebra, history and other groups of studies.

Both county superintendents and normal school men feel that the rural school course is a step in the right direction, but only a step. The course must be lengthened materially, or the entrance requirements raised, just as rapidly as an enlightened community sentiment will permit. State legislation is needed, such as Indiana enacted several years ago in her "minimum salary law," and in prescribing that "only high school graduates, or candidates of equivalent scholarship," shall be eligible for a certificate to teach in any of the public schools of the state; or such as Wisconsin's legislature has enacted this spring in passing a somewhat less effective minimum salary law. But in communities, for example, where school boards, supported by public opinion, think that twenty-five dollars or thirty dollars per month is adequate compensation for a good teacher, it is idle for a normal school to maintain a rural course of two years to which only high school graduates are admitted. High school graduates who have either ability or self-respect will not pursue a course which leads only to positions offering a chance to do missionary work.

Correspondence and Extension Courses

A recent innovation in normal schools is the establishment and spread of correspondence and extension courses. The movement is relatively new, but already twelve schools have engaged in extension work, while twenty announce courses that can be taken by correspondence for credit. In 1906 normal schools in five states were reported as doing something in the way of extension work. To this number must be added at least fourteen more at the present time. In most cases the catalogue statements about these courses are brief, but some of the schools have prepared special bulletins descriptive of this work. Macomb, Ill., one of the six schools to offer both of these lines of work, states in its regular annual catalogue that thirty-two teachers were enrolled last year in Correspondence, and seventy in Extension Courses. Arithmetic, Algebra, Agriculture, Bookkeeping, Commerce, Caesar, Cicero, Civics, Composition, Domestic Art, Domestic Science, Drawing, both Freehand and Mechanical, Economics, French, German, Geography, Geometry, History,—American, Ancient, Mediaeval, Modern and English—Physiology, Psychology, Philosophy of Education, Reading, Spelling, Sociology, and School Management, each has a place in the Correspondence Course of some normal school. Nearly the whole list named is offered by the Hays, Kansas, school. At least fifteen of the same list is offered by the school at Athens, Ga. Too few of the schools specify in their general catalogues the subjects offered to make a tabulation possible here. The same statement applies to the Extension Courses advertised. The Providence, R. I., Normal School, however, has conducted courses in American History, Arithmetic methods, Chemistry, Cooking, Kindergarten methods, Manual Training and Oral Reading, while Keene, N. H., has done extension work in Charcoal sketching, Basketry and Psychology.

The method of the extension work is two-fold. In some cases teachers employed in schools within easy reach of the normal come in to the school for regular class-room work on Saturdays or evenings. In other instances members of the normal faculties go out to certain centers, and there meet and instruct a class of teachers as they would do in their own classrooms. The following may be accepted as a fair and typical statement of the best work attempted in the normal schools along this line:

The Kalmazoo, Mich., school grants "an extension life certificate to mature students who are (1) high school graduates, (2) have taught six years, and (3) under the direction of the Western State Normal School faculty have completed work as follows: (a) three summer terms in residence, (b) two years of non-resident work. This non-resident work is either (1) class work at some center within range of the school, so that an instructor can meet the students once a week,—or (2) carefully organized courses taken by correspondence." Sixty-five students have completed the extension course in this school. The catalogue states that "a higher grade of work is necessary to satisfy the requirements than the average of class residence accomplishment."—"One of the important results has been the number of students who, after undertaking the extension course, have come to see that it was more possible than they had thought to enter upon and complete the life certificate course in residence." There is a third form of so-called extension work engaged in by many normal schools. It consists of the giving of occasional lectures, loaning of pictures, books, lantern slides and other helps, but is unsystematic, and offers no regular normal school credit, however helpful it may be. I have, therefore, ignored such examples of normal school extension work in my references to the schools that do it.

Rural School Sociology

One of the most promising features of normal school curricula is the introduction into eighteen schools of Rural School Sociology, a subject perhaps included in no course of study ten years ago, and very few even five years back. In most schools offering it, it is a required part of the Rural School Course, but it is made an elective in many schools for students in other courses. The newness of the subject may justify a list of the schools offering it:

Lewiston, Idaho.
Normal, Illinois.
Emporia, Kansas.
Bowling Green, Kentucky.
Natchitoches, Louisiana.
Farmington, Maine.
Worcester, Massachusetts.
Kalamazoo, Michigan.
Mt. Pleasant, Michigan.
Duluth, Minnesota.
Mankato, Minnesota.
Moorhead, Minnesota.
Kirksville, Missouri.
Keene, New Hampshire.
Fredericksburg, Virginia.
Harrisonburg, Virginia.
Cheney, Washington.
Athens, West Virginia.

From this table it will be observed that the subject has found its way into normal schools of the North, South, East and West. Its importance would justify the prophecy that the next five years will see its introduction into most of the normal schools of the country. The following paragraphs, quoted from departmental statements about the course as offered in two different schools, suggest the nature of the work offered in most of them:

"A study of a rural community and the factors that tend to make it a success, as the grange, school farmers' club, church, young people's agricultural clubs, etc. This will bring the teacher in touch with the Country Life Movement, develop the spirit of leadership and the ability to use the forces that uplift a community."—*Year Book,* p. 71, Mt. Pleasant, Mich., 1913.

"The object of this course is to present in a brief and practical way some of the most significant facts as to the conditions of life in the country, and the relations of the rural population as a whole, and especially as regards their work, their business welfare and interests, the character of their homes, and the social influences of community life in rural sections. The various agencies which may be made to contribute to the improvement of the means of communication, the homes, the schools, and the general well-being, are pointed out and discussed. The aim of the course is to give prospective teachers in rural communities a right understanding of country life and a proper attitude towards it, so that they may arouse in the minds of their pupils a love and respect for such life, and a keener appreciation of its great and varied possibilities." —*Catalogue,* p. 77, Harrisonburg, Va., 1912.

RURAL PRACTICE SCHOOLS

While no attempt was made to study the professional courses in general, as offered in the normal schools, an effort was made to discover to what extent the new interest in country schools, as reflected by Rural School Courses, and subjects pertaining to country life, has modified the Model or Training Schools of the various normal schools. Roark found in his study (Ped. Sem., 1906, Vol. 13) that "only two schools, Terre Haute, Ind., and Monmouth, Ore., provided rural practice schools." It is found that today twenty schools have Rural Training Schools in which students may observe and do their "practice" teaching before graduating, but only seven of these Rural Practice Schools are in connection with normal schools which have definitely organized Rural School Courses. The other thirteen Rural Training Schools serve normal schools which endeavor to show to their undergraduates the possibilities of model country school teaching under typical rural conditions, but do not attempt to relate such work to a course of study prepared especially for prospective rural teachers.

Indiana, for example, has long had a model rural school for both observation and practice of the senior class of the normal school at Terre Haute, but the normal does not have a rural school course. It virtually admits none save high school graduates to any of its courses, but the legal scholastic requirements for the teachers and the high salaries paid to rural teachers under the minimum salary law of the state, make it possible for the normal school to send a considerable number of its graduates into the rural schools. California normal schools are, for similar reasons, able to serve the rural schools with full-course, life certificate graduates. Under such circumstances the model rural school for practice purposes is no less desirable than in the case of the normal schools maintaining distinct rural school courses.

THE LANGUAGES

Latin, German, French, Greek, Spanish and Italian are the languages taught. The order just given is the order of their frequency in the list of electives. Latin is taught in ninety-one, three-fourths, of the schools surveyed. German is a close second, being offered in seventy-seven schools. French may be taken in forty-nine, Greek in sixteen, Spanish in nine, and Italian in one. The teaching of Greek in the normal schools is confined to the states Georgia, Illinois, Iowa, Missouri, Nebraska, New Mexico, Ohio, and Utah.

The character of the population readily suggests the reason for finding Spanish in some of the normals of California, Oklahoma and New Mexico, and, to a smaller extent, even Missouri. Lockhaven, Pa., announced its desire to prepare teachers for service in our Island possessions as the reason for introducing the subject into its course of study. Georgia, Mississippi, Ohio and South Carolina's Spanish courses are not accounted for, nor do we know the local reason for teaching Italian to teachers in Farmington, Me. The normal schools of New England,—Massachusetts, Connecticut, New Hampshire, and those of New York, New Jersey and California seem, in general, to offer no courses in foreign languages. They assume that it is done, or demand that it be done, in the high school, and so give themselves very largely to the strictly professional subjects, with some emphasis upon music, drawing and the newer subjects of manual training, domestic science, nature study, etc.

AGRICULTURE

An earlier paragraph called attention to the number of schools which have two or three-year agriculture courses. The number there given, however, by no means represents the part the normal schools are taking in the agricultural movement in education today. The survey shows that seventy-three schools, nearly two-thirds of the whole number, teach Agriculture to some extent. While a relatively small number, seven only, schedule distinct Two or Three-Year Agriculture Courses, to be elected by students with the same freedom that they elect Two-Year English or Two-Year Latin Courses, for example, the greater number of these seventy-three permit students to elect a certain amount of work in Agriculture, even while pursuing other courses.

In the schools which offer but a quarter or at most a semester of work in Agriculture there is, of course, only a very general treatment of the most elementary phases of the subject attempted, but in many cases the normal schools give ten or twenty weeks' courses in each of a number of the following more specialized subdivisions of the general subject:

Animal Husbandry
Agricultural Economics
Entomology and Bees
Farm Mechanics and the Farmstead
Feeds and Feeding
Farm Crops
Farm Management
History of Agricultural Education
Floriculture and Pomology
Horticulture
Plant Propagation
Selection and Breeding
Soil Fertility

As might be inferred, some of these topics represent attempts on the part of the departments of Biology, Economics and Chemistry to give practical courses in their respective fields. This is relatively easy to do because Agriculture, while preserving its own viewpoint, is of necessity a composite of a number of sciences and cannot be considered apart from their applications.

Statistics collected by the U. S. Bureau of Education indicate that 56 per cent of all the public normal schools of the United States taught Agriculture during the year 1909-1910. The present study shows that 61 per cent of the one hundred eighteen schools surveyed included it in their courses of study last year. An article written by E. O. Lyte, appearing in the Report of the United States Commissioner of Education, 1903, on the State Normal Schools of the United States, gives a historical sketch and a number of typical courses of study of normal schools of that day, but Agriculture is not mentioned at all. In some states at present the institute conductors going out to teachers' institutes from normal schools are more likely to carry with them select ears of seed corn, a score card for corn judging, and a number of bulletins issued by the U. S. Department of Agriculture than any outlines of Herbartian pedagogy or skeleton talks on correlation or "formal discipline."

Domestic Arts and Science

Not only the total number but the list of seventy-four normal schools teaching Domestic Science and Arts is almost identical with those offering Agriculture. Ruediger[2] found, in 1907, that "work in domestic art and science is offered in about 10 per cent of the schools." This study shows that about 62 per cent are offering courses in it today, an increase of more than 500 per cent in six years. Sewing and cooking are the representative subjects taught in this department, but many schools have long lists of specialized electives, including

Art needle work
Advanced cooking
Dietetics
Dressmaking
Food production and manufacture
Home cleaning
Home economics
Home nursing
Household sanitation
Household bacteriology
Laundering
Millinery
Nurse training
Practice work in household arts
Textiles

Nature Study

This subject is taught in sixty of the normal schools, including twenty-five in which no agriculture is scheduled. As the work in most instances seems to be largely confined to studies of plant life, it might be classified as work in Agriculture. This would raise the whole number teaching Agriculture to ninety-eight. Indeed, one cannot tell with any large degree of certainty what is taught by reading names of courses in catalogues, and in this case it happens that approximately the same character of work is done in different schools under the subject headings Agriculture, Botany, Nature Study and Elementary Science. The need of a more standardized nomenclature is as apparent here as in the case of grammatical terms and names of pedagogical courses.

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[2] Tendencies in the Normal Schools, in *Ed. Rev.,* Vol. 33, pp. 271-287—Wm. C. Ruediger.

Manual Training

Manual Training has a place in ninety-four of the schools studied,—nearly eighty per cent of them. In a few schools there is only wood-work of an elementary nature, but in many there are separate ten or twenty-weeks' courses in each subject of some combination of

- Architectural drawing
- Basketry
- Bent-iron work
- Blacksmithing
- Cabinet making
- Copper and brass work
- Forging
- Joinery
- Leather work
- Machine drawing
- Mechanical drawing
- Molding
- Pattern making
- Pottery
- Sheet metal work
- Sloyd
- Venetian iron work
- Wood turning

The aim of the work in most of the schools is to give only a minimum training along this line to the grade teachers who may have to work in systems of schools employing special supervisors or directors of the work, but a score of the normal schools are attempting to prepare teachers to go out as supervisors of the subject in the grades, or as departmental teachers in the high schools of their states.

Any one interested in knowing just what any particular public normal school of the United States is doing in the manual arts, domestic economy, agriculture or the sciences, may be helped by reference to " Table 105, in the Report of the U. S. Commissioner of Education, 1910, Vol. II, pp. 1097-1103.

Commercial Subjects

Under this caption come Bookkeeping, Stenography, Typewriting, Commercial Arithmetic, Commercial Law, Banking, Business Penmanship and Commercial or Industrial Geography. The latter is often given as a part of the regular courses in Geography when no other business courses are offered. Banking is in like manner a part of the work offered in a number of schools in Economics. Penmanship is offered in forty-eight schools, in most of which it is not a part of the Commercial Course; but Bookkeeping has a distinct place in forty-five schools; Stenography and Typewriting in thirty; Commercial Arithmetic in seventeen, and Commercial Law, sixteen.

The whole category of commercial subjects is relatively new in normal school curricula. Indeed, their appearance there is one of the evidences that many if not most of the normal schools conceive it to be a part of their legitimate function to train teachers for secondary schools as well as for the elementary and grammar grades. Their right to the secondary field is not infrequently challenged by the colleges and universities, but in spite of the challenge the normal schools the country over are entering in and possessing the land in part at least. As the high schools break away from what has been termed the "domination of the universities," as they establish varied courses in response to the demand for a vocational training in the secondary schools, it becomes more and more necessary for somebody to train teachers of commercial subjects. At first the business colleges alone could furnish such teachers. But while teachers so trained were fitted for teaching on the purely academic side, they were lacking in the professional point of view that the normal schools have always endeavored to give. The latter schools, therefore, are undertaking to meet this new demand by giving to the high schools men and women who not only know these technical subjects but know how to teach them as well.

Library Science

The responsibility for training teachers in library methods and science is coming to be felt by the normal schools. With a library in every city and village, and of late in almost every district school, the need of such training is obvious. Thirty-two of the normals, therefore, are offering some definite courses of instruction in this new science. The courses usually consist of ten or twenty lessons each, though in a few instances they mean nothing more than a few informal talks by the librarian to entering students in familiarizing them with the use of the library of the school, and the rules governing it.

The aim of even the best of these courses is not to train librarians. It is, on the contrary, to enable students to use the normal school library effectively as a tool in the prosecution of their work, and then in turn pass this knowledge on to pupils in the public schools where the need differs only in degree, not in kind. Among the most helpful topics of instruction noted are the following: The use of card catalogues; value and use of reference books, such as the leading dictionaries, encyclopaedias, atlases, gazetteers, World's Almanac, Who's Who, etc. Poole's Index and A. L. A. Catalogues are studied for their respective lines of help. Cataloguing and accessioning of books, the use of pictures in school work, with a consideration of sources, selection, classification and indexing, making bibliographies, showing what is to be learned from title page, index, preface, table of contents—these and others of the sort comprise the topics that are presented to normal school students in more than twenty-five per cent of the schools of the country today.

The movement may well be thought of as a part of the still larger attempt to "teach pupils how to study," in elementary school, high school, normal school and university even. Books and monographs are being written, lectures given, and courses offered the country over, indicating a swing of the pendulum from a consideration of the recitation, to methods of study as the really vital concern of the teacher today.

Public Speaking

A criticism to which the normal schools of the past have been subjected is that a subject so important as debating, public speaking or forensic exercises, has been left to the initiative of students themselves in their literary and debating societies. Public speaking was not required, and its encouragement was not undertaken by the school. An article in the *Ped. Sem.,* Vol. XIII, 1906, p. 223, contains the statement that the three schools of Tempe, Ariz., Peru, Neb., and Worcester, Mass., "make a special point of forensic training." Today twenty-six schools include it in their curricula, while still other schools include it, doubtless, under such a heading as "Expressive Reading," in contrast with *reading* or literature. Not only is there a remarkable increase of interest in the subject, as evidenced by its place in the curriculum, but the multiplication of student organizations along the same line, and under a semi-faculty control indicates the same tendency. Teachers are slowly throwing off the badges of their narrow professionalism, and coming more and more to be recognized as having interests, tastes and obligations in common with other members of society. With the entrance of the scholar into politics, and with the gradual socializing of the schools and their teachers, with the modernizing of the courses of study which brings the world of current interests into the school and invites the teacher to a larger participation in extra-class room life, it becomes more and more possible for a teacher who can think and speak on his feet, to extend his influence in ways not ordinarily possible a generation ago. The increasing emphasis upon public speaking is a reflection of this tendency, in part a cause, and partly, an effect.

Music and Drawing

Judged by numerical standards, music and drawing are the most universally taught of all the subjects treated in this paper. One hundred and four schools seem to offer the latter and one hundred and ten the former. Perhaps a statement has been over-looked in some of the catalogues and they are even more generally taught than these figures indicate. The absence in so many catalogues of either index or table of contents has made it necessary to look entirely through a great many catalogues for the data desired. Under such conditions omissions are not improbable.

Courses in these subjects are not often intellectually comparable with older subjects in the curriculum. But Music and Drawing are forms of art that contribute so much to the leisure and recreational opportunities of children that they may abundantly justify themselves in every school upon this ground alone.

Equalizing the Expense

States adopting the policy of establishing many normal schools, frequently state as one reason for the policy their desire to equalize the burden of expense to the teachers of the state. A new school brings the advantages it can offer nearer the door of a body of students and lessens the expense of travel, thereby encouraging more teachers to take normal school courses. In New Mexico, however, where schools are few and distances great the state is equalizing the expense incurred in travel by refunding to the normal school students of Silver City the "amount of their railroad fare in excess of $3.00 each way."

Curiously enough, Rhode Island, the smallest of the states, has conceived the notion of equalizing the normal school students' expenses in the same way, so it announces a mileage appropriation of $4,000, to be "distributed among those students who reside in the state at such a distance that they are unable to reach the school by the payment of a five-cent fare!" —"The aid furnished to any one student cannot exceed one hundred dollars per year." Clearly the state feels justified, not merely in paying a part of the transportation expenses of its students, but at least a part of their other legitimate expenses, if they are living too far from the school to go home daily.

Summary of Observations and Conclusions

1. There are great variations in practice as to the minimum age limit for admission, but the approach towards high school

graduation as a standard for admission insures an age limit that will be higher than the average school has had it in the past.

2. Medical inspection of the normal schools and a better health standard for admission are both decidedly increasing.

3. The moral character standards are not made very conspicuous in most of the catalogues, though the states almost uniformly require " evidence of good moral character " before granting certificates to teach. Nothing in this sort of study can show to what extent the moral character standards are mere " paper requirements." There is ground for the fear that excessive competition among the schools for students may sometimes result in the admission of those who are morally unfit to become teachers.

4. A common practice is to require entering students to pledge themselves to teach in the state giving them training. Two years is the popular limit for such pledge, though about one-third of the schools require no pledge at all.

5. Though there are still numerous courses open in most parts of the country (Cal., N. Y., Ind., and New England about the only exceptions) to students who have had but 8, 9, 10 or 11 years of academic training, such courses are decreasing in number, and the life-certificate courses are open only to high school graduates or their equivalent, in 75 per cent of the normal schools of the country.

6. Correspondence or extension work, or both, for credit, is already made possible for students in twenty-six normal schools, representing sixteen states, and every one of the great divisions from North Atlantic to Western.

7. Rural School Courses, Rural Training Schools, and such distinctly rural subjects as nature study, agriculture, and rural sociology are rapidly increasing in numbers.

8. Manual training and domestic science are found in 80 per cent of the normal schools. However, the surprise is not at their rapid introduction, but rather that there are any normal schools which do not offer them to-day.

9. Commercial courses, library science and public speaking are all finding definite places in progressive normal schools, the percentage and distribution of each one being such as to prophesy their being universally taught within a few years.

10. There is a growing tendency for normal schools to become teachers' colleges, with the same academic entrance requirements as the colleges have. In such cases the life certificate is granted upon completion of two years of the course (in a few cases, three) and the bachelor's degree after four years' work.

THE NORMAL SCHOOL IN CURRENT PEDAGOGICAL LITERATURE

The first characteristic of the literature of the present day dealing with normal schools is its paucity. The elementary school, high school, college and university all seem to receive very much more attention in the leading magazines and journals of the profession. It may be worthy of note that there is no publication to-day to serve as the especial exponent of normal school ideas, methods and problems, though the wide distribution of these schools, the importance of their work, the size of their combined faculties, and the complexity of normal school problems would suggest that there is a distinct place for such a medium.

In the next place, a survey of such normal school literature as has appeared recently impresses one with the shift in the center of gravity of its discussions. If a generation ago the schools were primarily busied with questions of methodology and psychological adjustment, they are as truly characterized by their sociological questions to-day. A reading of the titles named in the bibliography appended will make the truth of the foregoing statement evident. The almost kaleidoscopic changes in the elementary and secondary school curricula the past six or eight years have called for a new adjustment to them by the normal schools. The reorganization of their courses of study, the introduction of a half dozen new subjects, the duty of the normals to the country schools, the question as to their preparation of high school teachers, raising entrance requirements, duplicating college courses, granting degrees, standardizing courses of study or adapting themselves to local geographical and social conditions—these are among the questions and topics most often considered to-day.

To be sure the normal schools are not uninterested in all that is vital in educational psychology. Their departments of psychology and of education are affected by such contributions as are made by experiments within their own ranks or those of the colleges and universities; but while psychology still has a voice in saying *how* and *when* a lesson shall be presented to the child mind, *what lessons* shall be presented and what shall the schools refrain from presenting, are noisy sociological questions that the normal schools are trying to answer to-day along with the rest of the educational public. Most of the literature dealing with the normal schools at all, deals with some social aspect of their problems, therefore, whatever may be the extent of their concern with the psychology of their teaching.

In addition to the bibliography that follows, attention may be called to the bibliography of papers presented before the

N. E. A. on normal schools and training of teachers between 1864 and 1906, inclusive, and found in the Proc. N. E. A., 1906, pp. 707-711.

BIBLIOGRAPHY ON NORMAL SCHOOLS

BALCOMB, E. E. The place of the normal school in agricultural education. Proc. N. E. A., 1912, pp. 823-832.

BECKWITH, WALTER P. Conditions of admission to normal schools. Proc. N. E. A., 1903, pp. 566-569.

BOHANNON, EUGENE W. The work of the normal school in the reorganization of the elementary school curriculum. Proc. N. E. A., 1912, pp. 817-823.

BOLTON, F. E. The New Normal School Movement. Educational Review, June, 1913, pp. 56-65.

BURK, FREDERIC. Normal Schools and the Training of Teachers. Atlantic Monthly, Vol. 81. pp. 769-779.

BURNHAM, ERNEST. The special preparation of teachers for the rural schools through courses in state normal schools. Proc. N. E. A., 1910, pp. 583-588.

CHAMBERS, WILL GRANT. The Latest Ideal Normal School. Journal of Pedagogy, Vol. 14, pp. 325-339.

COOK, JOHN W. Capacity and limitations of the normal school in the professional preparation of high school teachers. Proc. N. E. A., 1907, pp. 628-636.

DEPT. OF EDUCATION. Univ. of Oreg. Eugene. State Normal School Systems of the U. S. Bulletin, Nov., 1905, pp. 43.

FELMLEY, DAVID. Extent to which normal schools and teachers' colleges should teach the use of school libraries. Proc. N. E. A., 1908, pp. 1087-1093.

GORDY, J. P. Rise and Growth of the Normal School Idea in the U. S. U. S. Bureau of Ed., Bulletin, 1891, No. 8.

GWINN, JOSEPH M. Tendencies in the Entrance Requirements of State Normal Schools. Education, Vol. 28, pp. 233-237.

HALSEY, R. H. Conditions of admission to normal schools. Proc. N. E. A., 1903, pp. 569-575.

HAWKINS, W. J. The attitude of the normal schools toward education. Proc. N. E. A., 1912, pp. 810-823.

HAYES, D. W. The function of the normal school in the special training of teachers for the rural school. Proc. N. E. A., 1912, pp. 856-862.

HARRIS, W. T. The future of the normal school. Proc. N. E. A., 1899, pp. 395-405.

HECHE, ARTHUR. A report on the Teaching and Practice of Hygiene in the Public Normal Schools of the U. S. Jour. Ed. Psy., Vol. 2, pp. 429-439.

HOLLAND, E. O. The Pennsylvania State Normal Schools and Public School System. 94 pp.

KEITH, J. A. H. The function of the normal school in academic education. Proc. N. E. A., 1912.

KIRK, JOHN R. The new normal school movement. The Educational Review, May, 1913, pp. 509-515.

—— ——. Will the same training in the normal school serve to prepare for both elementary and high school work? Proc. N. E. A., 1907, pp. 661-668.

—— ——. A statement of the issues now confronting the normal schools of the U. S. Proc. N. E. A., 1907, pp. 740-747.

LYTE, ELIPHALET O. The state normal schools of the U. S. Report Com. of Ed., 1903, Vol. I, Chap. XXII.

—— ——. What is an ideal course for a normal school? Proc. N. E. A., 1908, pp. 715-719.

MAXWELL, GUY E. Legitimate spheres of influence for the normal school in public education. Proc. N. E. A., 1910, pp. 569-573.

MONAHAN, A. C. The status of rural education in the U. S. Bulletin, 1913, No. 8, U. S. Bureau of Ed.

—— ——. Agricultural education in the state normal schools. Rep. U. S. Com. of Ed., 1911, Vol. I, pp. 367-370.

MONAHAN AND WRIGHT. Training Courses for Rural Teachers. U. S. Bureau of Ed., Bulletin, 1913, No. 2.

MERIAM, J. L. Normal School Education and Efficiency in Teaching. Columbia Univ. Contributions to Education, 1906. 152 pp.

MUTCHLER AND CRAIG. A course of study for the preparation of rural school teachers. U. S. Bureau of Education, Bulletin, 1912, No. 1.

MCKENNY, CHAS. Standards of Measuring the Efficiency of Normal School Students. Proc. N. E. A., 1912.

—— ——. Geographical and Historical Variations That Exist in Normal Schools. Committee's Report, Proc. N. E. A., 1899, pp. 854-861.

—— ——. Reports of U. S. Com. of Ed., Vol. I, 1911, pp. 100-102.

—— ——. Reports of U. S. Com. of Ed., Vol. II, 1911, Chap. XXIX.

—— ——. Reports of U. S. Com. of Ed., Vol. II, 1910, Chap. XXIV.

PAYNE, WM. H. The Ideal Normal School. Proc. N. E. A., 1902.

ROARK, RURIC N. Some Phases of the Internal Organization of State Normal Schools. Ped. Sem.. Vol. XIII, 1906, pp. 221-229.

RUEDIGER, WM. C. Recent Tendencies in the Normal Schools of the United States. Ed. Rev., Vol. 33, 1907, pp. 271-287.

SANDERS, WM. H. A Study of Professional Work As Presented in the State Normal Schools of the U. S. Ped. Sem., Vol. XX, March, 1913, pp. 48-57.

SEERLEY, HOMER H. Variations that exist in the normal schools of the U. S. because of geographical location. Proc. N. E. A., 1897, pp. 711-713.

—— ——. Preliminary Report of the Com. of Eleven on a Plan of Normal School Statistics. Proc. N. E. A., 1912.

THOMAS, A. O. The status of the normal school in education. Proc. N. E. A., 1908, pp. 704-710.

—— ——. Who should determine standards and courses for the training of teachers? Proc. N. E. A., 1909, pp. 592-596.

WICKERSHAM, JAMES P. Are the normal schools as they exist in our several states adequate to accomplish the work for which they were established? Proc. N. E. A., 1888, pp. 70-81.

WILLIAMS, H. G. The place of the normal school in a system of public education. Proc. N. E. A., 1909, pp. 548-556.

A CRITICAL STUDY OF THE HILLEGAS COMPOSITION SCALE

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I. Introduction

1. *Standards and Tests for Measuring School Efficiency.* In recent years considerable interest has been manifested by both educators and laymen in the question, "Are our schools and school systems doing their work efficiently?" In order to answer this important question many cities and towns throughout our country have instituted inquiries, surveys, or investigations. These investigations are in many cases in the hands of experts in educational administration who have attempted to develop and apply so-called scientific standards and tests for measuring the efficiency of schools. The most noteworthy of these investigations is that of the Committee on School Inquiry of the City of New York conducted from 1911-1913 (7).

The subject has assumed such importance that recently a committee was appointed by the National Council of Education to study the problems involved and the methods of attacking these problems. This committee presented a report through its chairman, Prof. George D. Strayer of Columbia University. The report was printed by the United States Bureau of Education (10). It treats briefly of a number of problems under various heads as, "business administration, educational organization, the recruiting of the teaching corps, and the accomplishment of children" (10, page 5). Brief reference is made to such problems as the enforcement of the compulsory education law; special classes for the tubercular, the blind, the deaf, and the crippled; mental defectives and super-normal children; retardation, elimination, promotion, and non-promotion; the efficiency of teachers; the accomplishment of school children in the various school subjects, etc. In connection with some of the above problems reference is made to methods to be used in attacking the problems.

The report discusses briefly three main methods of measurement—"first, measurement by personal opinion; second, measurement by comparison; or third, measurement by more or less well-established standards or units" (10, page 3). The first two methods are regarded as inadequate, while the third method is accepted as the most scientific. The report says, "It is only when we have a measuring stick which enables us to describe all of the quantities with which we deal in terms of definitely determined units that we can claim to have any adequate method of measurement" (10, page 4). Appended to the report is a bibliography of 339 titles relating to the subject of the report. No critical comment is made upon any of the articles cited. A teacher or administrator who should attempt to apply in practice any of these so-called scales or tests would experience the utmost difficulty—apart from the fact that in some cases special training or practice is required—because of the great differences in means, methods, procedure, and results in the various scales or tests under any one problem. Let us take "intelligence tests" by way of illustration. Investigators are by no means agreed as to what constitutes intelligence, what tests are most adequate and appropriate for measuring it, what procedure should be employed in giving tests, how the results should be interpreted, etc.

In the opinion of the writer the most important needs at present are the development of a scientific technique and the standardization of procedure in conducting experiments and tests, and in deriving scales. Many experiments, tests and scales are worthless because of faulty methods and procedure. Experimental and critical studies should be undertaken of the tests and scales so far proposed in order to determine their scientific validity and their applicability for administrative and pedagogical purposes. Furthermore, a series of comparative tests should be carried out in order to evaluate the various tests and scales. We are apt to be very profoundly impressed by reports of investigations, especially if they appear in ponderous volumes, interspersed with numerous tables, graphs, and statistical summaries that we do not understand. We either do not bother to read the reports and take their conclusions on faith, or else we stick to our preconceived notions about the various problems dealt with. Neither attitude is scientific. We should study the reports, particularly from the point of view of the criteria employed, and the methods and procedure used by the investigators in deriving their facts.

It is with the purpose in view of making a critical review of the Hillegas "Scale for the Measurement of Quality in English Composition by Young People" (3) that this study was undertaken. The aim is to determine the scientific validity of the scale and its applicability for administrative and pedagogical purposes. The Hillegas scale will be discussed under the following heads, (1) aim, (2) means, (3) method, (4) procedure, (5) results, (6) conclusions. Then will follow criticisms of the scale in which its advantages and disadvantages will be pointed out as they are conceived by the present writer and by others who have either studied the scale or attempted to test it by experiment or by actual application in practice.

2. *The Need for Standards for Measurement of Accomplishment in School Subjects.* Most progressive teachers will agree that the marking system as ordinarily employed in our schools is wholly unsatisfactory, unreliable, and unscientific, chiefly because of the absence of definite standards, the subjective nature of the standards used, and the consequent variation in the estimation of results. Furthermore, teachers will also agree that the efficiency of their work would be greatly increased if some standards could be devised that would approximate the definiteness, the uniformity, the precision, and the objectivity of units of physical measurement such as those of length, weight, etc.

The problem of measuring merit in composition by means of marks is particularly difficult because of the complexity of the psychological processes involved in composition work. It would be of great service to teachers if a scale could be devised that would enable them to judge the merit of compositions, to compare the compositions of different pupils to determine relative merit, to compare the results obtained by the pupils of one class taken as a group, with the results obtained by the pupils of another class in order to evaluate material and methods of teaching, and, what is of especial importance, to ascertain whether a particular pupil has improved in his composition work, and if so, how much he has improved. The Hillegas scale purports to be such a scale, and it is maintained by its advocates that it can be used for all the purposes suggested above (15, page 214). Let us now proceed to an examination of the scale.

II. The Hillegas Scale

1. *Aim.* The aim is to derive a scale for the measurement of quality in English composition by young people.

2. *Means.* The author gives a brief descriptive but not critical summary of the work done in the derivation of standards for measuring efficiency in spelling, arithmetic, and penmanship. He makes special reference to the work done in

spelling by Rice and Cornman, in arithmetic by Rice, Stone, and Courtis, in handwriting by Thorndike. He makes no critical comment whatever on this work, the inference being that he accepts it as valid.

The composition scale was derived by an original empirical study of about 7,000 English compositions by young people. The age, sex, grade, ability, and social conditions of the writers of the compositions are not stated. The samples were obtained from various sources which are not stated, but the fact is mentioned that there was "a definite attempt to obtain particularly the very poorest and the best work that is done in the schools" (3, page 26).

3. *Method.* The collective statistical method was employed in the study. The theory of the method is explained in detail by means of description, graphs, and tables in Section 5 (3, pages 18-24). Briefly stated the main point of the method is as follows, "Differences that are equally often noticed are equal, unless the differences are either always or never noticed" (3, page 18). This principle is explained by Prof. Thorndike in two articles which were printed while the study was in progress (11, 12). The unit in the scale is "that difference which seventy-five per cent of the judges are able to distinguish. . . . When two samples are found such that seventy-five per cent of the judges agree in calling one better than the other the difference is just the difference used as the unit in this scale" (3, page 21).

4. *Procedure.* The compositions collected numbering about seven thousand were graded roughly by the author and another into ten classes. The criteria used in grading the samples are not mentioned. From these classes seventy-five samples were selected. To these several artificial samples were added in order to measure samples at the extreme ends of the scale. The poorest samples were written by adults who strove consciously to write very poor English (and they succeeded). Several samples of good work in composition were added from the youthful writings of successful authors and from the works of college freshmen. The final set of samples was composed of eighty-three selections of varying degrees of merit. The samples were typewritten and mimeographed, all mistakes of the original being carefully reproduced. Sets of these samples were sent to about one hundred individuals accompanied by the following printed request: "Please arrange these in order of merit as specimens of English compositions by young people. If there are two or more of them which seem to you to be absolutely equal in merit, give them the same number as a score. Score your

results on the accompanying sheet calling the worst specimen 1, the next worst 2, the next worst 3, and so on" (3, page 26).

The records which were made by those who sent in their returns were copied and for each sample in the set the distribution of the positions assigned by the judges was ascertained. (Table III, 3, page 29.) By comparing the positions assigned to each sample with those assigned to each other sample a determination was made of the number of judges who had considered any given sample better than any other given sample. (Table IV, 3, page 30.) The number of "better" judgments in Table IV was reduced to per cents of the whole number of judgments. (Table V, 3, page 31.)

On the basis of the judgments of seventy-three indivdiuals a methodical selection was made from the eighty-three samples of a smaller set containing all the important gradations in quality from the poorest to the best. Several new artificial samples were added making in all a set of twenty-seven samples, which are reproduced in full on pages 32-39 (3). A number of judges were selected "whose positions as teachers, authors and literary workers implied that they were competent judges of English writing" (3, page 39). Practically the same mode of procedure was followed with the second set of samples as with the first. The results are shown in Tables VI, VII, and VIII, pages 41-43 (3). Table IX shows the absolute differences in value between the various samples in this set. This table was derived from Table VIII by expressing the per cent of "better" judgments in terms of the unit of the scale, which is the difference which exactly seventy-five per cent of the judges are able to distinguish.

In order to check the results Professor Thorndike "secured the judgments of forty-one individuals who were especially competent to judge merit in English writing" (3, page 40). The results are shown in Tables X, XI, XII, XIII (3, pages 45-48). Two more samples were added to the twenty-seven, making a total of twenty-nine, which were judged by twelve individuals. (Table XIV, 3, page 50).

As one of the first steps in the procedure the zero point of the scale was located as sample 580 "on the basis of the judgments of (1) nine men of special literary ability, five of them professors of English, of whom four are also authors of standard text-books on English composition, and four men of marked general intellect and literary ability, (2) eleven gifted teachers familiar with secondary education, and (3) eight psychologists familiar with the significance of scales and zero points in the case of intellectual abilities and products" (3, page 16). The median opinion of the twenty-eight judges determined sample 580 as the zero point in the scale. (See table on page 17.)

5. *Results.* Altogether 202 individuals had judged one or the other sets of samples from which the scale was formed. Twenty-one of the samples were common to each of the sets. The data contained in Tables IV, VII, XI, and XV, relating to these samples, were combined and the results were reduced to per cents of "better" judgments and to absolute differences in value. These combined results are given in Tables XVI, XVII, and XVIII (3, pages 52-54). From these samples a series of ten were selected to constitute the scale. The difference in value between each sample and the next one approximates the unit of the scale. The results of the combined judgments by 202 judges of the samples selected for the scale are compared with the results for the same samples of the judgments of the forty-one judges in the control test in Table XIX (3, page 55). This table is reproduced below.

TABLE XIX

The Samples Selected for the Scale, the Differences Between Adjacent Samples and the Difference Between Each Sample and Sample 580 for Each of Two Groups of Judges.

Sample	Group of 202 judges		Group of 41 judges	
	Differences each from preceding	Differences from sample 580	Differences each from preceding	Differences from sample 580
580	...	000	...	000
595	183	183	173	173
618	77	260	81	254
94	109	369	141	395
519	105	474	*	...
534	111	585	246†	641
196	90	675	91	732
221	97	772	91	823
571	66	838	41	864
177	99	937	71	935

* This sample is not in the set judged by this group.
† This is the difference between samples 94 and 534.

In order to understand more clearly how the figures in the above table were obtained it must be repeated that the results were tabulated as follows: (1) the distribution of the various samples according to order of merit was determined; (2) the distribution according to "better" judgments was obtained by comparing each sample with each other sample in the set and determining how many judges considered the given sample better than each of the other samples; (3) the number of "better" judgments was reduced to per cents of the total number of judgments; (4) the amount of superiority was determined by taking one hundred as that amount of difference which causes seventy-five per cent of the judges to judge one sample as better than another.

Dr. Hillegas in this study presents his results almost exclusively by means of tables. He does not describe his results fully. He describes the results shown in Table XIX as follows: "Table XIX shows the differences between adjacent samples and the absolute values for the samples of the scale. One part of the table shows the results for all the judges and the other part shows the results obtained from the group of judges described on page 40. The differences in the absolute values in the two results are surprisingly small. In no case do the values vary by a complete step in the scale, and the value of the best sample is almost the same in both results. This similarity of values indicates that the values in the scale are reasonably near the values that experts in English composition would assign to the samples" (3, page 56).

The series of ten compositions constituting the scale are reproduced below. Each selection has a number for convenience in reference, and the absolute value of each selection is also given.

(Reprint of pages 5 to 8.)

Sample 580. **Value 0.** Artificial sample.

Letter.

Dear Sir: I write to say that it aint a square deal Schools is I say they is I went to a school. red and gree green and brown aint it hito bit I say he don't know his business not to-day nor yeaterday and you know it and I want Jennie to get me out.

Sample 595. **Value 183.** Artificial sample.

My Favorite Book.

the book I refer to read is Ichabod Crane, it is an grate book and I like to rede it. Ichabod Crame was a man and a man wrote a book and it is called Ichabod Crane i like it because the man called it ichabod crane when I read it for it is such a great book.

Sample 618. **Value 260.** Artificial sample.

The Advantage of Tyranny.

Advantage evils are things of tyranny and there are many advantage evils. One thing is that when they opress the people they suffer awful I think it is a terrible thing when they say that you can be hanged down or trodden down without mercy and the tyranny does what they want there was tyrans in the revolutionary war and so they throwed off the yok.

Sample 94. **Value 369.** Written by a boy in the second year of the high school, aged 14 years.

Sulla as a Tyrant.

When Sulla came back from his conquest Marius had put himself consul so sulla with the army he had with him in his conquest siezed the government from Marius and put himself in consul and had a list of his enemys printy and the men whoes names were on this list we beheaded.

Sample 519. **Value 474.** Written by a girl in the third year of the high school, aged 17 years.

De Quincy.

First: De Quincys mother was a beautiful women and through her De Quincy inhereted much of his genius.

His running away from school enfluenced him much as he roamed through the woods, valleys and his mind became very meditative.

The greatest enfluence of De Quincy's life was the opium habit. If it was not for this habit it is doubtful whether we would now be reading his writings.

His companions during his college course and even before that time were great enfluences. The surroundings of De Quincy were enfluences. Not only De Quincy's habit of opium but other habits which were peculiar to his life.

His marriage to the woman which he did not especially care for.

The many well educated and noteworthy friends of De Quincy.

Sample 534. **Value 585.** Written by a boy in the fourth year of the high school, aged 16 years.

Fluellen.

The passages given show the following characteristic of Fluellen: his inclination to brag, his professed knowledge of History, his complaining character, his great patriotism, pride of his leader, admired honesty, revengeful, love of fun and punishment of those who deserve it.

Sample 196. **Value 675.** Written by a girl in the first year of the high school, aged 18 years.

Ichabod Crane.

Ichabod Crane was a schoolmaster in a place called Sleepy Hollow. He was tall and slim with broad shoulders, long arms that dangled far below his coat sleeves. His feet looked as if they might easily have been used for shovels. His nose was long and his entire frame was most loosely hung to-gether.

Sample 221. **Value 772.** Written by a boy in the third year of the high school, aged 16 years.

Going Down with Victory.

As we road down Lombard Street, we saw flags waving from nearly every window. I surely felt proud that day to be the driver of the gaily decorated coach. Again and again we were cheered as we drove slowly to the postmasters, to await the coming of his majestie's mail. There wasn't one of the gaily bedecked coaches that could have compared with ours, in my estimation. So with waving flags and fluttering hearts we waited for the coming of the mail and the expected tidings of victory.

When at last it did arrive the postmaster began to quickly sort the bundles, we waited anxiously. Immediately upon receiving our bundles, I lashed the horses and they responded with a jump. Out into the country we drove at reckless speed—everywhere spreading like wildfire the news, "Victory!" The exileration that we all felt was shared with the horses. Up and down grade and over bridges, we drove at breakneck speed and spreading the news at every hamlet with that one cry "Victory!" When at last we were back home again, it was with the hope that we should have another ride some day with "Victory."

Sample 571. **Value 838.** Written by a boy in the Freshman class in college.

Venus of Melos.

In looking at this statue we think, not of wisdom, or power, or force, but just of beauty. She stands resting the weight of her body on one foot, and advancing the other (left) with knee bent. The posture causes the figure to sway slightly to one side, describing a fine curved line. The lower limbs are draped but the upper part of the body is uncovered. (The unfortunate loss of the statue's arms prevents a positive knowledge of its original attitude.) The eyes are partly closed, having something of a dreamy langour. The nose is perfectly cut, the mouth and chin are moulded in adorable curves. Yet to say that every feature is of faultless perfection is but cold praise. No analysis can convey the sense of her peerless beauty.

Sample 177. **Value 937.** Written by a boy in the Freshman class in college.

A Foreigner's Tribute to Joan of Arc.

Joan of Arc, worn out by the suffering that was thrust upon her, nethertheless appeared with a brave mien before the Bishop of Beauvais. She knew, had always known that she must die when her mission was fulfilled and death held no terrors for her. To all the bishop's questions she answered firmly and without hesitation. The bishop failed to confuse her and at last condemned her to death for heresy, bidding her recant if she would live. She refused and was lead to prison, from there to death.

While the flames were writhing around her she bade the old bishop who stood by her to move away or he would be injured. Her last thought was of others and De Quincy says, that recant was no more in her mind than on her lips. She died as she lived, with a prayer on her lips and listening to the voices that had whispered to her so often.

The heroism of Joan of Arc was wonderful. We do not know what form her great patriotism took or how far it really led her. She spoke of hearing voices and of seeing visions. We only know that she resolved to save her country, knowing though she did so, it would cost her her life. Yet she never hesitated. She was uneducated save for the lessons taught her by nature. Yet she led armies and crowned the dauphin, king of France. She was only a girl, yet she could silence a great bishop by words that came from her heart and from her faith. She was only a woman, yet she could die as bravely as any martyr who had gone before.

6. *Conclusions.* We may consider under the head of conclusions what Dr. Hillegas says concerning the use of the scale, what it measures, and what its limitations are. With

regard to what the scale measures he says, "The scale is composed of sample English compositions, the qualities of which have been determined by more than four hundred competent judges. The values which are assigned to the various samples express their quality in the same sense, though not as accurately, as millimeters express the lengths of lines. . . . A difference of two hundred in this scale is equal to twice a difference of one hundred taken in any part of the scale. Thus sample 94 with a value of 369 is a little more than twice as good an English composition as sample 595 with a value of 183. Sample 519 with a value of 474 is about one-half as good as sample 177 with a value of 937" (3, page 13).

With reference to the use of the scale Dr. Hillegas says, "The value of any English composition may be obtained by placing it beside the samples constituting the scale and determining to which it most nearly corresponds" (3, page 13). He goes into details as to how the scale is to be used and then adds, "By this method the value of any sample may be expressed as accurately as the individual cares to make it" (3, page 14).

In fairness to the author of the scale it must be stated that he does not regard the scale as absolutely perfect. He says, "No claim is made that the values given in the scale are absolutely accurate. Variation among the judges was very great, and to make a perfect scale would require the services of many more judges than it was possible to secure for this study. The scale is accurate enough to be of very great practical value in measuring the merit of English compositions written in the upper grades of the elementary school and in the high school. The scale will also serve as the basis of future efforts in this direction, and it can be refined and perfected part by part" (3, page 56).

III. Criticism of the Hillegas Scale

1. *Articles Concerning the Scale.*

The Hillegas scale has aroused considerable discussion in pedagogical circles, and a number of articles have appeared concerning it in various pedagogical and scientific journals. The work was conducted by Dr. Hillegas with the assistance of Dr. Thorndike, who wrote several articles about the study while it was in progress (11, 12). After the publication of the scale an article appeared from the pen of Dr. Thorndike in which the significance and use of the scale was discussed (13). The present writer is aware of only one article which deals with the Hillegas scale experimentally, the article of

F. W. Johnson (4). Other articles merely describe the scale without any critical comment upon it (6). Still other articles criticize various aspects of the work merely on the basis of the opinion of the author of the article. While, of course, such criticisms are of little scientific value, at the same time, in some cases the authors reveal considerable critical insight and penetration. By some the character of the selections in the scale has been criticized (1, 4). Others have attacked the methods used in deriving the scale (2). The main criticisms will be presented under the following heads: (a) methods, (b) procedure, (c) results, (d) conclusions. Under the head of results the selections in the scale will be examined critically. Under the head of conclusions the applicability of the scale for administrative and pedagogical purposes will be discussed. Finally, a summary will be given of the advantages and disadvantages of the scale with several suggestions for the further study of such problems as are treated in this article.

2. *Criticism of Methods.*

(1) Hillegas' study can not be called a pedagogical experiment because it does not fulfill the requirements of such an experiment. According to Meumann (5, page 21) " a pedagogical experiment is one in which the child is the object,—of which the direct meaning and aim is the determination of the values of pedagogical means and methods." A pedagogical experiment must fulfill four conditions: "(1) The first necessity of all pedagogical experiments is the purposeful bringing together of the phenomena to be investigated; (2) voluntary change of the circumstances according to the purpose of the experimenter; (3) these voluntary changes must be guided by certain scientific purposes; (4) there must be possible a quantitative measurement of the observed phenomena" (5, page 20). Hillegas did not study the composition work of school children under normal school room conditions. He studied the opinions of " expert " judges as to the relative merit of pupil's compositions. He tells us nothing at all of the conditions under which the compositions that formed the material of his study were written. Since he loses sight of this important requirement we are warranted in assuming that the conditions were not uniform nor carefully controlled. Hillegas proposes that his scale should be used for pedagogical purposes, but it was not derived by experimental pedagogical methods. It was derived by purely statistical methods.

Experimental pedagogy employs three methods, (1) statistics, (2) experimentation, (3) measurement. Statistics are used chiefly in the study of the physical characteristics of pupils. It is a misuse of statistical method to apply it to the derivation of standards for the "measurement" of the efficiency of pupils' work and of methods of teaching. Such a method is utterly lacking in pedagogical criteria. A result may be obtained that is valid when judged from a statistical point of view, but it may be entirely valueless when viewed from the standpoint of pedagogical standards.

(2) The scale was derived by a statistical treatment applied to opinions. The data were therefore subjective rather than objective. The scale is based upon a determination by collective statistical methods of the central tendencies of opinion as to relative merit of a number of compositions. A scale based upon the average opinion of a large number of judges is not, strictly speaking, an objective scale. The methods used in this study are substantially the same as those employed in deriving the Thorndike scale for handwriting (page 4), consequently a criticism of the methods used in Thorndike's study will also apply to those employed by Hillegas in this study. In an article on the experimental study of handwriting (2, page 28), James Drever says, referring to Thorndike's scale for measuring merit in writing,—"Now the fundamental objection to such a scale is that it can never be in any real sense objective, nor can its use by any individual give an objective determination of the merit or value of any specimen of writing. The scale is not objective, because it is simply the average of a number of individual opinions of merit, a composite portrait of a number of subjective opinions, or a 'blurred result,' to use Dr. Myers' significant expression. The use of the scale by any individual teacher or investigator is vitiated through and through by individual opinion. We may doubtless get reasonably good results by using a scale of such a kind as compared with the results which would be got by estimating handwriting without a scale of any kind, but the whole idea is scientifically unsatisfactory."

(3) The study does not state the criteria used by the judges in judging the compositions. It is therefore impossible to ascertain the common elements of their criteria. Hillegas says, "No attempt has been made in this study to define merit. The term as here used means just that quality which competent persons commonly consider as merit, and the scale measures just this quality" (3, page 13). No person, no matter how competent he may be in judging merit in composition, has any absolute standard of merit. His standard must necessarily be relative and variable. A child's composition

is one of the most complex pieces of school work. It is extremely difficult to analyze. It is made up of a number of factors—literary, psychological, and pedagogical,—each one of which is in turn exceedingly complex. Although we do not know exactly what standards the judges used we may assume that their standards were expert literary and not pedagogical. We are warranted in making this assumption because Hillegas was careful to choose judges who were "competent judges of English writing," and for the additional reason that he refers only to literary elements, form and content (3, page 13).

3. *Criticism of Procedure.*

In order that any experiment, investigation or study may be considered scientific it must fulfill the conditions of a scientific method of investigation. It must have three stages, (1) the preliminary series, (2) the real series, and (3) the control series. The purpose of the preliminary series is to allow the observer to become accustomed to the mode of procedure and "to avoid the great change in the figures due to practice. These experiments must never be included in the results" (8, page 70). The purpose of the real series is to derive the data upon which the results and conclusions of the investigation are based. The purpose of the control series is to check the results obtained in the real series. Hillegas' study did not fulfill the above conditions. There was no preliminary series, or rather the preliminary series and the real series were one and the same. There are errors in the results because the judges had no opportunity to become familiar with the mode of procedure, and because their judgments would have been entirely different with practice. If the same judges were asked to arrange the same compositions in the order of merit, a second time, without any knowledge of how they had arranged them the first time, the results would undoubtedly be different.

Professor Thorndike, in an article on the significance and use of the Hillegas scale, referring to the "amount of error to be expected in grading specimens of English writing" (13, p. 556) says, "three facts will be proved as such studies progress. First, the errors will be large; second, they will diminish with practice in using such a scale and with improvements in the scale itself; third, they will—at least after sufficient practice, be smaller than the errors now made by teachers in grading paragraph-writing for general merit" (13, p. 556). If the errors in using the scale are large at first, and if "they will diminish with practice in using such a scale," why is it not also true that the errors made by the judges in arranging the compositions in order of merit were large at first, and that they would have diminished with practice?

4. *Criticism of Results.*

(1) The results in Hillegas' study are given almost exclusively in tabular form. There is very little descriptive treatment of the results. Every careful scientific investigation, in addition to graphic and tabular representation of the results should also give a full descriptive presentation of the general and detailed results.

(2) The selections in the scale have been criticized by Dall (1, page 115) and by Johnson (4). Dall says, "You cannot properly compare paragraphs based on different topics, recollections or quotations from school readers, and attempts at expression of totally distinct emotions" (1, p. 115). He regards the samples in the scale as valueless for comparison. He further criticizes them on the ground that they are not representative of real children's expression.

Johnson tested the use of the Hillegas scale by submitting eight selections taken from the actual compositions of high school pupils, to forty-two teachers of English composition in a number of high schools, normal schools and colleges. He also submitted the same selections to two other groups of judges, one consisting of five teachers of English in the University High School, and the other group consisting of sixteen graduate students taking a course in statistical study of school materials in the University of Chicago. Each judge received a copy of the Hillegas scale and was asked to grade the material carefully and independently without consulting anybody. At present we are not concerned with Johnson's results but with his criticism of the selections in the scale. He concludes that the material of the scale is not representative, because the selections are on formal subjects—history or reading in literature. They do not display any originality of thought. They are far removed from all present-day human experience. Johnson says, "It is altogether impossible to compare compositions on subjects that offer opportunity for originality of thought and expression with the formal material found in the scale which depends for its content largely upon the memory of books read or discussed in class. The scale differs in kind from the material to be measured. It is like using a yardstick to determine the weight of material in the physical laboratory" (4, p. 48). Johnson believes that the scale can be used for evaluating the elements of form in writing, but that it is entirely inadequate for evaluating the elements of content. The present writer does not agree with this conclusion because in the first place, any material result of school work such as a composition, must be judged as a whole, and secondly, it must not be judged according to expert, adult criteria (literary, scientific, etc.), but it must be judged according to pedagogical standards.

To show that Johnson is right when he says that the material in the scale "depends for its content largely upon the memory of books read or discussed in class," let us compare one of the selections in the scale with the original of which it is a reproduction. The sample is as follows:

Sample 196. **Value 675.** Written by a girl in the first year of the high school, aged 18 years.

Ichabod Crane.

Ichabod Crane was a schoolmaster in a place called Sleepy Hollow. He was tall and slim with broad shoulders, long arms that dangled far below his coat sleeves. His feet looked as if they might easily have been used for shovels. His nose was long and his entire frame was most loosely hung to-gether.

The original from Washington Irving is as follows:

"The cognomen of Crane was not inapplicable to his person. He was tall, but exceedingly lank, with narrow shoulders, long arms and legs, hands that dangled a mile out of his sleeves, feet that might have served for shovels, and his whole frame most loosely hung together." Sample 196 has a comparatively high position in the scale in spite of the fact that it is purely verbal in its content. It shows no originality in either thought or expression. It is not based upon any real experience of the pupil who wrote it. When regarded from the standpoint of the question, "To what extent is this composition an expression of the individuality of the pupil?" our judgment of its value must be very low indeed.

5. *Criticism of Conclusions.*

The author of the Hillegas scale and its advocates believe that it can be used for administrative and pedagogical purposes. They believe that supervisors, administrators and investigators can use the scale for measuring the efficiency of a school or of a system of schools, in composition work. In fact the scale has already been used in a number of school surveys. It is further believed that teachers can use the scale to determine the merit of the composition work of their pupils and to evaluate their methods in teaching composition. Professor Thorndike says, "By using such scales, the absolute gain which any pupil made in any year could be measured in the same way as his gain in height, weight, wages, or pulse rate, and the results of different means and methods of teaching could be demonstrated with exactitude instead of being guessed at" (15, p. 214). It is impossible to separate the administrative and the pedagogical application of the scale. Its use for administrative purposes must be in harmony with pedagogical conditions and requirements. Now, the chief pedagogical requirement that the Hillegas scale fails to fulfill is that it regards the composition work of pupils merely from the standpoint of the result. It does not deal with the process. It does not concern itself with the question—"How did the child write the composition?" According to Meumann (5, page 310), the efficiency of a method of instruction is determined not merely by the outer result, but more so by the manner in which this result is reached. He says that it is not sufficient that a result is reached only materially, but it must be so reached that (1) the highest conceivable formal training of the mental powers of the child is secured; (2) the result must be attained by methods that are appropriate to the stage of development and to the individual endowment of the child; (3) the method must have a desirable moral effect. He points out that certain methods of instruction and of learning can strengthen the will of the child, increase his self-confidence, and enhance his self-activity, while other methods may have the contrary effect. In view of this, how is it possible to determine the efficiency of a method of teaching composition merely by measuring the result by the Hillegas scale? Meumann holds that that method of instruction and work is the best which (1) helps to attain a given school goal most quickly and completely; (2) fulfills the requirements of formal mental training in the highest degree; (3) has the most beneficial ethical effects. From the point of view of these all-important pedagogical standards the most essential thing is not, "what results did the child attain?" but, "how did he attain these results?" In the opinion of the present writer, herein lies the greatest defect of the Hillegas scale and of all other scales, tests, and systems of marking which consider merely the material results of the pupil's work, and entirely lose sight of the conditions under which the work was accomplished. In fact, Thorndike begins his report of his investigation of achievement in drawing (14, page 1) with the following words, "We measure a child's achievement in drawings by the drawings which he produces in connection with the conditions under which he produces them." If this is true of drawings, why is it not equally true of compositions? Why do we not measure a child's achievement in compositions by the compositions which he produces, in connection with the conditions under which he produces them?

F. N. Scott, in an article in which he opposes the use of the Hillegas scale in the teaching process (9), is aware of the fact that the scale is not in harmony with pedagogical standards when he says, "Suppose that instead of asking, Is this composition, written by some unknown X, better than that written by some unknown Y? we ask, Which is the more sincere expression of some growing individuality? or, Which will be more legitimately effective in its appeal to a certain audience? . . . It is quite possible that a pupil whose best work is rated 900 in Dr. Hillegas' scale, may nevertheless be degenerating instead of advancing—he may be treading the primrose path to the everlasting fire; whereas the pupil whose best work is rated 400 may be on his way to that freedom and strength and sincerity of speech which will one day make him a power for good. Viewed from the standpoint of their spiritual development, the first should be rated zero, the second 1000" (9, pp. 4, 5).

6. *Summary and Suggestions.*

The Hillegas scale was derived as the result of much patient and careful work on the part of the author and those who cooperated with him. The greatest importance of such work is that it shows that judgments of the efficiency of children in accomplishing school tasks, of the efficiency of a school or a system of schools, of the efficiency of teachers, can no longer be left to the opinion of an individual or of a group of individuals. We must derive scientific standards for such purposes, but they must be derived by scientific methods of investigation which are at the same time in harmony with pedagogical aims, conditions, and standards.

It may be true that we can get more satisfactory results in judging pupils' compositions by means of the Hillegas scale than by ordinary school marks, but the scale is wholly unsatisfactory and invalid from the scientific point of view for the following reasons.

1. The methods used in deriving the scale are faulty. They are purely statistical and not experimental-pedagogical.

2. The scale is not really an objective one, because it was derived by a statistical study of subjective data—opinions.

3. The judges determined the qualities of the compositions according to expert literary standards, not according to pedagogical standards.

4. The study was defective in its mode of procedure in that it lacked a preliminary series.

5. The selections in the scale do not represent real children's expression. They are too formal in their character, and do not display any originality of thought or expression. They are based upon verbal rather than concrete images.

6. The scale regards the composition work of pupils merely from the standpoint of the result. It does not touch the questions, "How did the children write the compositions? To what extent is each composition a real expression of the inner life of the child? What was the influence of the work on the inner life of the child?"

In closing this review the writer wishes to suggest that great caution should be exercised before we apply the results and conclusions of experiments and investigations in practice. We should rather turn our attention to the critical examination of all tests, scales, etc., with a view to determining their scientific validity. We should strive to perfect a scientific technique, and to standardize methods and modes of procedure. We should evaluate various tests, scales, etc., by a series of comparative tests. We should remember that in all pedagogical experiments we should use pedagogical criteria; that when we make the school child the object of our experimentation we must consider not merely his accomplishment, but also his capacity to do the work in question; not only the results, but also the conditions under which the results were obtained. It is only by adhering strictly to our experimental-pedagogical criteria that a scientific pedagogy will be developed.

BIBLIOGRAPHY

1. DALL, W. H. Measuring the Merit of English Writing. Science, 1911, Vol. 34, p. 115.
2. DREVER, J. Notes on the Experimental Study of Writing. Journal of Experimental Pedagogy, March, 1913, Vol. 2, No. 1, pp. 25-29.
3. HILLEGAS, M. B. A Scale for the Measurement of Quality in English Composition by Young People. Reprinted from Teachers College Record, Vol. 13, No. 4, September, 1912. Teachers College, Columbia University, New York, 1913.
4. JOHNSON, F. W. The Hillegas-Thorndike Scale for Measurement of Quality in English Composition by Young People. School Review, 1913, Vol. 21, pp. 39-49.
5. MEUMANN, E. Abriss der experimentellen Pädagogik. Engelmann, Leipzig, 1914.
6. NOYES, E. C. Progress in standardizing the measurement of composition. English Journal, Nov., 1912, Vol. 1, pp. 532-536.
7. Report of the Committee on School Inquiry of the City of New York. New York, 1913.

8. Schulze, R. Experimental Psychology and Pedagogy. (Translated from the German by R. Pintner.) Macmillan, New York, 1912.
9. Scott, F. N. Our Problems. The English Journal, January, 1913, Vol. 2, No. 1, pp. 1-10.
10. Strayer, G. D. Standards and Tests for Measuring the Efficiency of Schools or Systems of Schools. United States Bureau of Education, Bulletin, 1913, No. 13, Whole No. 521.
11. Thorndike, E. L. A Scale for Merit in English Writing by Young People. Journal of Educational Psychology, 1911, Vol. 2, pp. 361-368.
12. —— ——. A Scale for Measuring the Merit of English Writing. Science, 1911, Vol. 33, pp. 935-938.
13. —— ——. Notes on the Significance and Use of the Hillegas Scale for Measuring the Quality of English Composition. English Journal, 1913, Vol. 2, pp. 551-561.
14. —— ——. The Measurement of Achievement in Drawing. Teachers College Record, Nov., 1913, Vol. 14, No. 5.
15. —— ——. Education. Macmillan, 1912.
16. —— ——. Handwriting. Teachers College Record, Vol. 2, No. 2.

FIRST STEPS IN VERBAL EXPRESSION

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The accompanying vocabulary and notes are offered as a contribution to the materials for child-study. The only features which may give them distinctive value are the notes on the development of the sentence and the arrangement of the words by months.

The child under observation is the girl R. She was born on June 12, 1910. It is necessary to bear this date in mind in order to estimate the influence of the seasons on the development of intelligence and the power of expression. In the general development of her mental and physical faculties R has been normal. Her weight and measurements have coincided rather closely with the averages for well cared-for children. She has suffered from no illness. The mother is a teacher of Greek and the father of English. They have, however, persistently attempted to shield their off-spring from the dangers which lurk in their professional tendencies. They have never used " baby-talk," but R has learned a few so-called baby words from relatives and friends. During nine months of the year R lives in a suburb of New York. Her second summer she spent on a farm by the sea in Maine and her third on a farm in Vermont.

The word-list was kept chronologically. R's parents were with her constantly during her waking hours and jotted down words as soon as they were used independently, intelligently, and intelligibly. In most cases words were recorded, not only in the month in which they first occurred, but in the order in which they made their appearance. It is believed that this method offers advantages for the study of certain important aspects of linguistic development. No attempt was made to record systematically the imperfect pronunciation of childhood. Words are classified as first used. Only in the case of irregular verbs have the various tense forms been regarded as separate words.

Preverbal Expression

No attempt was made to keep a complete account of R's preverbal expression, but from my notes I gather the following items with regard to it. R laughed for the first time in her 9th week. During the following week she first endeavored to express herself by means of a series of sounds. In her 9th month she imitated the barking of a dog. In her 10th month she imitated a rooster's crow, a bird's chirp, and her father's sleeping. In her 11th month she imitated a kiss. In her 13th month, when she already used 10 or 11 words and soon before she learned to say "no," she first shook her head to indicate negation.

Words Understood and Words Used

In the 14th month R's mother said to her: "R, go and pull Daddie's ear." R went immediately to her father and pulled his ear vigorously. Her own name was used for the first time in the 16th month, ear in the 15th, and pull in the 19th. Other similar incidents go to show that she frequently understood words perfectly several months before she used them.

Correction of Pronunciation

Comparison with the record of Major's boy leads me to think that R's ear for pronunciation is rather exceptionally acute. From her 13th month on she pronounced most of her words quite as well as most adults. In the beginning she often reduplicated. She said: däddä, titty (kitty), byby, mamma, bahbah (bossie), wahwah (water), bäbä (bath), Bebe (Beatrice). The first word which was not reduplicated came in the 11th month. It was "baby." There was no reduplication after the 13th month. In the early months th was pronounced d; initial f was sh, ch or ts; initial j was hard g; ch was ts; initial s in combination with another consonant was sometimes dropped. Stick became 'tick; stone was 'tone; and school was 'cool. R's attention was caught mainly by the consonants. Occasionally she would invert these with rather astonishing results, as when she made god out of dog. Or she would use the one consonant which happened to strike her attention without regard for the others or for the vowels, as when she made ga out of tongue.

From the beginning R was conscious of the variations between her speech and that of her elders. Her efforts to approximate adult standards were constant. She would repeat a word many times in an effort to pronounce it correctly. Conscious correction of baby words began in the 19th month. The initial f sound was the last one to cause trouble. It was not until the 26th month that it was at last mastered. Thereafter R had almost no difficulty with matters of pronunciation.

One feature of the process of self-correction is not without pedagogical importance. If R happened to pronounce a sound correctly the first time she had occasion to use it she never had difficulty with that particular sound. If, however, she got started wrong it was only after long and painful struggle that the sound in question was correctly produced in the words learned before the sound itself had been mastered. For example, in the 19th month fire was learned as chire. Later it became tsire. In the 26th month it was pronounced correctly. Thereafter she used this sound correctly in all the new words in which it occurred. But for a considerable time many of the original mispronunciations persisted. In general those learned earliest were the last to be eliminated.

The pedagogical lesson is obvious. It is of the utmost importance that the child should be given every possible assistance to the end that it may be started correctly in the use of each new sound. Persons speaking within the hearing of a child should take pains to enunciate unmistakably. This should be done even long before the child begins to talk, for, as has already been noted, children may understand many weeks before they speak, and understanding surely implies a lively attention to sounds.

Development of the Sentence

Since the mastery of sentence forms is from several points of view more significant than the mere acquisition of words, I have in Table A put down a number of R's sentences in the order in which they occurred. For the 14th and 15th months this list includes all the sentences which were recorded and probably the only ones which were used. For the other months I have included only those which seem to indicate some advance.

The identification of a child's first sentence is more difficult than might be supposed. In the 14th month R used as one word a series of sounds which an uncritical listener would have put down as a sentence. In her bath when she managed to capture the sponge she would cry, " Here-it-is! " Though these sounds may have served the purpose of a sentence the various syllables certainly had no separate functions in R's mind. Therefore this was no true sentence. On the other hand R never made one word serve unmistakably as a sentence. When she said " dada " in the 9th month she may have meant, " This is Daddie." But what went on in her mind is merely matter of conjecture.

" Beatrice all gone," uttered on the 12th day of the 15th month, was her first sentence. Here appears the characteristic feature of infantile speech, as it is, in fact, the mark of all primitive expression. I refer to the lack of connectives. The words absolutely necessary to the expression of a thought are used in juxtaposition long before the connectives are mastered. In this first sentence we have two notions connected. The name Beatrice has been used before; likewise the adjective phrase, "all gone." Here the two are connected merely by being pronounced together. The verb to be, which is necessary to complete expression of the idea involved, appears for the first time eight months later.

The second sentence is much more complicated. It means, Daddie will come through the door. Here we have a verb and a modifier. But the verb is incomplete and there is no preposition to express the relation which evidently existed in the child's mind between the coming of Daddie and the door. "Girls cook" was achieved when R was looking at the picture of two little girls cooking. It appears to be the first sentence which is formally correct and complete. But the verbal significance of "cook" is at least doubtful. The fourth sentence, uttered in the 17th month, indicates a great advance in the variety of ideas associated, but it is entirely without verbs and connectives. "Daddie shoes wet" is set down as an example of R's early tendencies in the treatment of inflections. Just as many ideas appeared long before the words necessary to their expression so a sense of relationships often antedated the acquisition of the grammatical apparatus requisite for making them clear. R habitually used nouns in a possessive sense depending on word order to carry her meaning. Thus she would say, "Daddie mother," "Aunt Ida house." The fact that she was never misunderstood throws a good deal of light on certain aspects of our linguistic development. The possessive form finally appeared in the 20th month.

The first sentence indubitably perfect both as to form and as to psychological implications is number six, "Daddie gave R new shoes." This masterpiece created such a glow of pride in the infant breast that R repeated it three times in order to make sure of her accomplishment. Number seven is a genuine complex sentence. R spoke it as she brought to her mother a pair of stockings to be hung up on Christmas eve. Her evident meaning was, Hang up these stocking on Christmas in order that I may get some new babies in them. Number ten is compound. The conjunction which might have been used to connect the clauses had been learned during the preceding month but had not yet been used for this purpose. Number twelve is complex and much better in form than other constructions equally complicated which preceded it. A compound sentence with a conjunction connecting the clauses finally appears in the 20th month. In this sentence, number sixteen, appear the first infinitive and the first participle. From this time on these forms were freely and correctly used.

The sentences, "I guess that's a wheel," and "Mother acts very busy" exhibit a power of expressing comparatively fine shades of meaning by means of the newly mastered sentence forms.

Development of Interests

An examination of Table B leads me to the conclusion that R's vocabulary developed in response to the demands made by her expanding intelligence rather than in accordance with the opportunities and incitements offered by her changing environment. There is, of course, the usual early preoccupation with the parts of the body, clothes and domestic objects. It is noticeable, however, that the first class of objects to claim any considerable number of additions is that placed under the heading Occupations. The child's boat, bag, and rock were more important to her than her teeth, her hair, or her stockings. After the 15th month domestic objects claim the chief attention. The child is more and more taking in things beyond the range of her personal comfort or pleasure. She begins now to talk of cooking utensils, umbrellas and pipes, objects with which she has no immediate concern. In the 17th and 18th months there comes a much greater intellectual achievement. Suddenly the child takes in the moon, the sun, the sky, the rain, and the night. Eight words relating to such objects are added in two months. Then there are none for the four months succeeding except the word snow, which was learned, naturally, in winter. That is, natural phenomena of a certain degree of prominence were learned practically at the same time and then this side of the child's development ceased for the time being. During the 19th, 20th, and 21st months the house itself divides attention with the smaller and more immediate objects within the house. The names of the various rooms are learned as well as the designations of various structural parts.

The list of words referring to animals seems to show that the seasonal element is less important than one would naturally suppose. The 13th, 14th, 15th, 25th, 26th, and 27th months came in summer and were spent in the country where wild and domestic animals abounded. The 19th and 20th months came in midwinter and were spent in the city. Yet with the exception of the 25th there is no notable variation in the number of words referring to animals learned during these months. The words turtle, goat, and robin were learned in winter when the creatures referred to lived only in pictures and stories. The summer season furnished the interest, the incentive to investigate, the joy in contemplation, but the acquisition of words and the enjoyment of immediate observation and contact were not always coincident. Advancing intelligence may lead the child to inquire in winter about an animal seen in summer. Or the process may be reversed. Anticipation of seeing an animal may lead to questions and the addition of knowledge and words. Thus at a time later than the period covered by this record a promised visit to a zoological garden added largely to R's vocabulary many weeks before the happy event took place.

It is worthy of note that R's interest in plants came much later than that in animals. This is no doubt largely chiefly due to the fact that animals move. Hay, hay-cock, grass, and pine tree were learned in midwinter. Interest in them was chiefly occupational. Real excitement with regard to plant life came in the 23rd month. This month came between April 12th and May 11th, when the plants were doing something. From that time on through R's third summer the names of plants and their various parts and aspects followed rather closely the changing life of the season.

Words for such ideal facts as time, nothing, right, and wrong naturally came late, the number of them being largest toward the very end of the period covered by this record. The same remark may be made with regard to such words as edge, end, back, front, and other words designating position or division. The child would have no occasion to make the analysis necessary to the intelligent use of such words before having a considerable experience with the tables, boards, sticks, etc., with reference to which they are used. It is to be noted, however, that such class words as man and girl came very early in R's development and were used correctly from the beginning. In fact a considerable part of the usual baby vocabulary is made up of such terms. The child's ability to select the salient features in a complex and classify correctly individuals which differ in everything except the one important aspect may well be amazing to one who has not observed rather carefully the development of child life before the period of speech.

Consideration of the classification of verbs leads to no different conclusion. The first verbs, gallop, go, and back, referred, not to R's activities, but to those of a horse. At first she herself moved very little; she was taking in big, outside things. Even in the 15th month the verb kick was learned in connection with the activity of a calf. It is not until the 16th month that the child's own movements began to occupy the central place. And from that time on they steadily maintained themselves. The first verbs designated as social, please and thank, had no significance; it is in the 17th month that hurt and keep indicate a real growth of social sense. From the 20th month on appear at irregular intervals such words as tell, hear, like, follow, love, and celebrate. The earliest attention to purely intellectual activity is indicated by the acquisition of know in the 19th month. Learn, guess, and mean, in the months immediately following, show that this interest was real and cumulative at this time.

The classification of adjectives exhibits little that is worthy of remark. At first there are the absolutely necessary quantitative modifiers, more, big, etc. From the beginning, however, the majority are qualitative and have reference to physical characteristics. The next noticeable fact is the early eruption of qualitative adjectives referring to moral qualities. This, however, lacks the significance which cursory examination would lead one to assign to it. Good and nice probably meant agreeable or acceptable. Dear was used with signs of endearment, but these may have been largely the result of imitation. Careful was undoubtedly used with a real sense of its meaning, but R's associations with it may have been purely physical. It is not until the 21st month that there is an unquestionable use of adjectives in a moral sense. Better, naughty, and bad were certainly used much as they are by adults. Adjectives referring to intellectual qualities occur at the same time. Joke, the first noun applicable to a purely intellectual phenomenon, comes also in the 21st month, and know, the first verb belonging to the same region, appears in the 19th.

Mastery of Grammar

Two points in connection with R's preliminary adventures in English grammar are worth recording. Like Darwin's boy, she made a hard fight for regularity before she finally succumbed and consented to yield to the demands made by our adult conjugations. At the time when this record was brought to a close she still said brang and, occasionally, swang. Soon after this she said, "R bote Mother." When this was not accepted she changed it to "R bitted Mother," and finally, in despair, she fell back on the universal resource of childhood and said, "R did bite Mother." About the same time she said: "Fall, fell—fall, fell. Mother, what is fall? What is fell?"

An experience of R's in the formation of nouns shows with what ease a child handles regular forms. In her 27th month she used the endings ie and ikin to form the diminutives of familiar nouns. She used them correctly and with perfect ease. During the same month she was asked what instrument was used in the splitting of wood and answered promptly, "A splitter."

The other point has to do with the child's method of acquiring grammatical machinery. The child proceeds by concentrating attention on one thing at a time. Even in the addition of words to the vocabulary this principle is discoverable. This, that, these, one were acquired in the same month. The same is true of the following groups of words: china, aluminum, brass; almost, not quite; right, wrong; back, front. But in the mastering of grammatical forms this law of concentration is even more evident. Before her 19th month R used not a single preposition. During that month she used 7, nearly a third as many as she had mastered at the end of her 27th month. It was during her 20th month that R first used tenses consciously. She would say, "R will do," and then do something and say, "R did do." A little later, toward the end of the same month, her attention turned to the plural number. She would say very precisely, like one repeating a lesson: "R good girl. R and Mother good girls," with strong emphasis on the word in the plural.

During the 22nd month attention turned to personal pronouns and especially to their distinctions of gender. On one occasion a boy doll was given to her. Soon afterward she was heard to soliloquize: "Grandaddie gave him to me. Mother brushes her teeth. Daddie brushes his teeth." The emphasis was strong on the pronouns, and it is evident that they furnished the connecting links between the different parts of the soliloquy. In fact the whole speech was in the nature of an exercise. A glance at the word-list shows that R learned 6 personal pronouns during this month, as many as she had acquired during all her previous life.

Personal pronouns referring to herself gave her trouble up to her 24th month. For example, when asked, "Have you finished?" she might answer, "Yes, you have finished." On one occasion she noticed a change in her mother's appearance and said to her: "She is all dressed up—you—she has changed her dress." With gender and number she had had no difficulty since a much earlier period.

The Process of Speech Development as a Whole

With regard to R's process of speech development as a whole it seems to me that it was largely self-conscious and that it was motivated by the nascent desire for social relations. With regard to the first point, a part of the material given under the last heading has served, with more of the same character, as the basis for my conclusion. A few more incidents culled from my notes may serve to make the matter clearer.

In the 18th month R had learned A and B. She would read these and then point to the other letters saying, "Um; -um—um"—meaning, apparently, that she wished to learn them too. During her 19th month she got into the habit of pointing to objects for which she had no names and saying, "That?" A little later she would say, "Don't know that." In her 23rd month she framed her wish more definitely. She would say, "R want to know that." In the 21st month she soliloquized after having been left to go to sleep: "Daddie walk on grass. R walk on grass—no. Daddie walk on grass—yes. Daddie walk on snow. Snow deep. Know that word." It was at this time that R first became conscious of her personal appearance. In her 22nd month she began to "pretend." In the 24th she played she was grown up and told a story to one of her dolls beginning, "When R was a little girl." In the 26th she often asked, "What Mother and Daddie talking about?" or "What Mother reading about?" It evidently troubled her to hear words which she could not understand. Somewhat later, after the close of the period covered by this record, R invented a language for her rocking-horse. This language had a regular vocabulary and for a short time it was used consistently. This invention was probably due to the influence of R's first German lesson.

In general during this early period R gave more conscious attention to the mastery of speech than to any other one thing. It took up vastly more of her attention than food or clothes. Its only rival was physical play. But R would often stop the most engaging physical sport to get a word for some object with which she was dealing or to pay attention to the talk of her elders.

My other point, the one with regard to the child's motive for mastering so complicated a thing as the English language, is extremely difficult to prove. Yet my experience with R and some ten or twelve other young children whom I have had opportunity to observe leads me to believe very definitely that a child's motive for learning words and grammatical forms cannot be called a selfish or practical one. It is not the result of a sharp demand made by his immediate environment.

I was started on the track of this conclusion by observing that the first words learned by children are not the ones which may be put to practical use. Of the 32 words used by R at the end of her 14th month certainly not more than half-a-dozen were utilized to secure things agreeable to her or to prevent operations or conditions to which she objected. Her vocabulary was in the main a means of expression. Bahbah (bossie) was uttered with every sign of ecstacy when a cow appeared on the scene, or it was chanted in a sort of hymn of praise when R was going to sleep or lying in her bed waiting to be taken up after waking. She did not want a cow. So far as she knew a cow was of no use to her. But the word bahbah expressed her delight in the images connected with it.

As time went on words were used more and more to establish with those about her a common basis of understanding and enjoyment. In the first months there was little communication. The great element in R's intellectual life was satisfaction in mutual identification. For example, in the 17th month R insisted on talking to a guest. She would hold up her hand and say, "Hand," or point to the door and say, "Door." She had nothing to say about hand or door. Her pleasure lay solely in establishing a common intellectual basis by identifying these objects and naming them.

A slightly higher stage, something nearer communication, had been indicated by an incident which antedated this. R saw the moon and cried, "Mamma, moon! Mamma, moon!" This was evidently not mere identification. R evidently meant, "Mamma, there is the moon." The first perfectly clear instance of communication came in the 19th month. It was in this month that R first imparted to the world a piece of information which she alone possessed. The momentous sentence which finally broke down the wall between her inner consciousness and the outside universe was: "Teeth hurt." It was pronounced with all the solemnity demanded by the occasion. But even this sentence, dealing as it did with an immediate physical fact, was not pronounced for the sake of securing any immediate physical result. The fact was communicated in a perfectly impersonal manner. It was not before her 24th month that R began to ask for things. And what was said about the vocabulary at fourteen months applies even more strikingly to that at twenty-seven. Of what use to a two-year-old child are a long list of color words and the names of a lot of flowers which the average adult could not identify?

It seems to me as clear as anything can be in this uncertain realm that the child exerts ear and eye and vocal organs in order that it may enter into the social life of the wonderful giants with whom it lives.

TABLE A

Sentences

15th Month
1. Beatrice all gone.
2. Daddie come door.

16th Month.
3. Girls cook.

17th Month
4. Daddie. Beatrice. choo-choo, school.

18th Month
5. Daddie shoes wet.
6. Daddie gave Rhoda new shoes.
7. Hang Christmas—new babies—stockings.

19th Month
8. Teeth hurt.
9. Daddie take bath.
10. Daddie type-write, R eat bread, (pause) mamma dress.
11. Baby nextdoor cry.
12. R brush teeth way Daddie does.

20th Month
13. Let's play ball, Mamma.
14. R likes bread, (pause) Daddie likes bread, (pause) Mamma likes potatoes, (long pause) bossies like hay.
15. R get up on chair and look out window.
16. R and Daddie went shopping to store and Mamma stay home to get dinner.

21st Month
17. I guess that's a wheel.
18. I like hair that way; it looks pretty.

23rd Month
19. R been very naughty girl; wasted ink.
20. R busy digging.
21. This is sitting down.
22. I want to know that.
23. Mother acts very busy.

24th Month
24. Mother go to park all alone without R coming along.
25. (Imitating Mother telling a story) When R was a little girl had dollie called Beth.
26. When R is big girl she will eat strawberries and have big dollie and make speeches.

TABLE B

Classification of Words According to Interests

	NOUNS																		
Month	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Body	..	..	..	..	..	..	9	1	3	..	4	1	4	..	1	..	..	3	1
Food	..	..	..	..	1	1	2	2	1	1	4	2	2	..	..	4	3	4	1
Clothes	..	..	1	..	..	1	7	..	3	4	..	5	1	1	1	1	..	2	..
Personal belongings of others	..	..	..	..	..	..	2	..	2	2	5	1	1	1	5	2	3	2	..
Domestic objects	..	..	..	..	1	..	6	6	5	9	13	13	9	4	10	7	9	10	3
House	..	..	..	..	..	..	..	..	1	..	4	4	5	..	1	1	3	5	..
Topography	..	..	..	..	..	..	1	..	..	..	1	1	..	2	..	3	9	9	6
Particular places	..	..	..	..	..	..	..	..	..	..	..	..	1	..	1	1	..	1	1
Meteorology	..	..	..	..	..	..	..	..	3	5	..	..	1	..	2	..	..	3	1
Locomotion	..	..	..	..	..	..	1	..	1	..	1	..	..	..	..	..	2	..	1
Animals	..	1	..	..	1	1	4	..	3	..	3	4	1	..	4	4	7	4	4
Particular animals	..	..	..	..	..	3	1	..	..	..	2	1	..	..	2	..	..	..	..
Plants	..	..	..	..	..	..	1	1	..	..	1	2	2	1	3	5	5	12	8
Occupations	..	1	..	..	..	4	6	2	..	2	1	1	2	..	3	1	5	2	..
Particular dolls or toys	..	..	..	..	..	..	..	..	1	..	1	1	3	1	..	..	..	..	..
Experiences	..	..	..	..	..	..	..	2	..	1	..	1	..	..	..	1	3	3	1
Time	..	..	..	..	..	..	..	..	..	2	..	1	1	..	..	..	1	1	..
Quantity	..	..	..	..	..	..	..	..	..	..	..	..	1	1	3	2	..	1	2
Position	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	2	3	1	..
People	..	..	1	1	..	1	..	..	1	..	..	1	..	..	2	1	1	6	1
Particular persons	1	..	1	..	1	..	..	3	1	2	3	2	1	..	2	2	1	1	1
Institutions	..	..	..	..	..	..	..	..	1	..	1	1	..	..	..	..	..	..	1
Ideal fact	..	..	..	..	..	..	..	..	..	1	1	1	2	1	..	3	5	6	4
Alphabet	..	..	..	..	..	..	..	..	..	3	1	4	3	3	3	2	3	4	..

	VERBS																		
Month	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Motion	..	..	..	..	..	4	2	1	1	1	1	6	2	..	..	2	3	5	3
Natural processes	..	..	..	..	..	..	..	..	..	..	..	..	..	..	..	1	..	..	..
Personal activity	..	..	..	..	..	..	..	3	14	11	18	10	11	4	10	6	13	9	5
Copulative or auxiliary	..	..	..	..	..	..	..	..	..	..	..	2	..	..	2	1	..	..	..
Household	..	..	..	..	..	..	..	1	..	1	1	2	2	..	1	4	5	1	1
Social action	..	..	..	..	..	..	2	..	2	..	..	3	1	..	3	4	2	..	4
Mental	..	..	..	..	..	..	..	..	..	..	1	3	2	..	4	3	3	2	2

TABLE B—*Continued*

	ADJECTIVES																		
Month	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24	25	26	27
Definitive	..	..	..	..	..	..	..	..	..	2	3	..	..	..	..	..	..	..	..
Place	..	..	..	..	..	1	..	..	..	..	1	..	2	..	1	..	1	..	..
Quantitative	..	..	..	..	..	..	1	1	1	..	..	1	2	1	4	1	1	1	2
Qualitative-physical	..	..	..	..	..	..	2	..	3	3	4	2	6	..	1	5	10	7	3
Qualitative-mental	..	..	..	..	..	..	..	..	..	..	..	..	2	..	2	1	2	3	6
Qualitative-moral	..	..	..	..	..	..	..	1	2	1	..	..	1	..	1	1	..	..	..

TABLE C

Vocabulary

9th Month

Noun. Daddie.

10th Month

Nouns. Byby, kitty.

11th Month

Nouns. Mamma, baby, diaper.

12th Month

Noun. Man.

13th Month

Nouns. Bossy, water, bath, Beatrice.

14th Month

Nouns. Cow, stick Jove (a calf), Dotty (a calf) duck, Lady (a horse), button, girl, milk, book, ball.

Verbs. Gallop, go, back, walk.

Adjectives. Gone.

Adverbs. There, no, all, here.

Interjection. Goodbye.

15th Month.

Nouns. Stocking, hat, teeth, chair, hole, barn, pig, bib, mill, blacks (applied to shoes), boat, chin, bag, cup, tongue, coat, ear, hair, eye, hand, horse, paper, rock, apple, bottle, handkerchief, string, crow, nose, door, Dinah (a calf), belt, cave, brush, dish, spoon, dog, ring, shoe, tree.

Verbs. Come, please, thank, kick.

Adjectives. More, hot, dirty.

16th Month

Nouns. Ida, Jessie, orange, key, mouth, pin, R (own name), stone, cart, kiss, bed, coal, pail, cover, leaf, egg, bowl.

Verbs. Eat, prick, cook, hold.

Adjectives. Big, good.

17th Month

Nouns. Neck, train, brow, Argus (toy dog), juice, bar, quilt, pillow, gloves, picture, dress, pocket, school, Grandaddie, light, boy, hen, sheep, moon, apron, pipe, sun, tail, porch, cheek, thermometer.

Verbs. Break, clap, pick, keep, chew, squeeze, knock, open, throw, tear, ride, hurt, blow, bow, do, caught.

Adjectives. Green, yellow, dear, two, cold, careful.

Adverb. Out.

18th Month

Nouns. Umbrella, spot, Sadie, pencil, A, letter, balloon, accident, Maud, time, B, paint, strap, star, sweater, rain, glass, garter, frog, fish, bunny, package, C, night, toast, napkin, couch, desk, snow, drawer, sky, Christmas, basket, petticoat.

Verbs. Bite, cut, broke, smell, dust, drop, get up, gave, lay, shut, hang, look, see, sit.

Adjectives. Clean, nice, new, a (article), other, wet.

Adverb. Yes.

Conjunction. And.

19th Month

Nouns. Drink, back-door, tray, pot, plant, necktie, nursery, study, waste-basket, cereal, broth, ribbon, knife, wreath, clothespin, automobile, clothesline, educator (a kind of cracker), Harvey, Don (a dog), Ralph, bread, turtle, pocketbook, cuff, church, knee, foot, head, cotton, library, Duke (a dog), Willie, goat, monkey, O, throat, coat-hanger, name, plate, dining-room, fire, ice, needle, pajama, poem, mother.

Verbs. Hook, pull, tie, take, lock, rock, typewrite, smoke, dance, pat, shave, lace, stick, read, tuck, put, get, cry, fall, fell, know.

Adjectives. Dry, like, this, that, these, warm, blue, red, nextdoor.

Adverbs. Not, outdoors.

Pronoun. One.

Prepositions. In, up, down, off, by, beside, for.

20th Month

Nouns. Sack, stove, wrapper, clock, kitchen, sled, lily, Winthrop, Frederick, clothes-horse, ceiling, potato, hay, frying-pan, roasting-pan, kettle, handle, house, shoulder, hay-cock, tune, down-puff, lion, camel, scissors, underclothes, fork, summer, turnip, Major (a horse), cut, children, muff, mouse, window, pain, S, T, D, E, store, dinner, tub, rubbers, purse, hoof.

Verbs. Has, stay, run, iron, suck, fix, tell, mend, play, like, hurry, climb, shake, whistle, want, hear, tumble, say, said, learn, turn, drive, let, shop, went, will, did.

Adjectives. Stuck, little, own, tight.

Adverbs. Where, about, home, too, just, away.

Pronouns. I, my.

Prepositions. On, from, to, about, out.

21st Month

Nouns. Flag, window-sill, story, Lotta, Rollo (a toy dog), Bob, papa, bench, birthday, stool, thing, banister, soap, rug, wheel, finger-nail, lip, joke, scarf, shower-bath, grass, Main Street, hinge, radiator, chamber, pie, word, cellar, bristles, vaseline, sink, skin, wheatena, money, pine tree, robin, piece, ice-box, way, F, G, H.

Verbs. Slide, wash, peek, help, guess, talk, wag, wipe, look out, wear, pour, poke, tickle, push, dig, mean, spill.

Adjectives. Gray, white, brown, deep, right, left, better, pretty, bent, empty, fat, great, funny.

Adverbs. Along, pretty soon, back, then, now, sometimes, perhaps, certainly, of course, since, until, down.

Pronouns. You, it, myself.

Prepositions. Over, around, of.

Interjection. Pshaw!

22nd Month

Nouns. Princeton (a doll), trousers, speck, stitch, nothing, envelope, strainer, mountain, coop, park, pea, hoe, rake, L, M, N.

Verbs. Ring, plant, squeak, make, brush.
Adjective. Many.
Adverb. Rather.
Pronouns. Our, his, her, your, he, she.

23rd Month

Nouns. Appetite, sofa, card, note, match, backyard, ladder, Johnnie, tassle, pansy, scrap, lap, ink, something, mop, coffee, East Orange, Mr. T-R, Mrs. T-N, butterfly, shovel, slipper, woman, colt, rope, barber, dandelion, bird, cloud, hide-and-seek, bracelet, sash, rain-drop, goat, perfume, trunk, hammock, bud, Fan (a horse), Prince (a horse), pigeon, bottom, spoonful, whole, bowl, P, Q, R.
Verbs. Waste, pound, lift, saw, need, stretch, leave, haul, touch, been, act, remember, forget, cough, belong, suppose, feed, clear up, is.
Adjectives. Busy, next, large, small, one, three, naughty, sorry, holy.
Adverbs. To-morow, till, very, right off, back-and-forth.
Pronoun. Someone.
Preposition. Without.

24th Month

Nouns. Country, New York, pants, lots, milk-bag, fireless-cooker, fence, weather, all, wire, wistaria, cork, mosquito, dollar, coal, edge, Uncle Frank, Mr. F——n, paw, steeple, top, camera, hinge, tube, seed, butter, spinach, caterpillar, honeysuckle, present, shame, wheelbarrow, board, bouquet, people, breakfast, box, supper, U, V.
Verbs. Follow, buy, telephone, unlock, swing, float, knit, teach, had, seen, write, change, boil, shook, grow, love, cover, taste, cost, dream.
Adjectives. Silk, worn out, much, baked, bad, German, steep, fine, strong, dirty.
Adverbs. Every day, almost, quite, so, hardly, softly.
Pronouns. Who, what.
Prepositions. Before, through.

25th Month

Nouns. Shade, curtain, screw-driver, cherry, strawberry, seat, purse, right, wrong, buttercup, oats, well, farmer, brook, bee, honey, field, songsparrow, pasture, insect watch-fob, Mr. P——r, sugar, mud pie, bead, syringa, orchard, anything, woods, slop-pail, cream, end, drum, roof, splinter, bluebird, brown thrush, borax, train, engine, Fourth of July, star-spangled banner, cantaloupe, camp, shed, bump, plate, surprise, can, tree-house, scratch, back, front, jumping-rope, chipmunk, mud, elastic, number, rattle, egg-beater, J, K, I.
Verbs. Lick, string, sail, have, clean, catch, hop, strike, undo, use, think, hull, mash, chase, speak, sew, study, tip, slam, hammer, step, pack, celebrate, spank, work, buzz.
Adjectives. Four, cunning, fragile, tall, aged, slippery, aluminum, china, ugly, brass, near, pink, sore, well.
Adverbs. Already, how, once, when, upstairs.
Pronoun. Their.
Prepositions. Instead of, after.
Conjunction. But.
Interjection. Bang.

26th Month

Nouns. Mat, rice, twins, job, mattress, scar, wood, cornhusk, thunder, pole, woodshed, path, knot, skirt, trowel, speech, everybody, toe, dust, stomach, Mr. O——e, shelf, book-shelf, minute, gate, bedding, Greece, rest, vein, rascal, rapscallion, mischief, finch, magazine, pile, tank, measuring-cup, rykon (a cracker), hen-coop, middle, housework, wagon, shirt, Thetford Hill, feather, cone, fern, cannibal, bush, cake, stall, village, sister, banana, fog, braces, axe, hill, hollow, rainbow, primrose, currant, tangle, sachet, clover, daisy, goldenrod, mustard, meadow-sweet, giant, grandstand, pain, choke-cherry, river, W, X, Y, Z.

Verbs. Tuck, split, chop, creep, has broken, kneel, scrub, try, fold, wade, spin, scamper, fit, lie, gather, scold.

Adjectives. Queer, tired, cute, gold, embroidered, easy, purple, enough, faded, sour, greasy.

Adverbs. Backwards, somewhere, still, almost, ever, never.

Pronouns. Each, me we, us, him, they, them.

Preposition. Inside.

Conjunctions. Or, either, nor.

27th Month

Nouns. Sea, pool, stump, cocoa, dew, thistle, tongue, tack, pageant, tapir, Queen Ann's lace, whip-poor-will, aster, throat, Norfolk, owl, banner, self-heal, queen, eagle, maidenhair, ocean, blackberry, furniture, racket, sunlight, stamen, reflection, station, stem, buggy, jar, mountain-climber, lord, freight, bunch.

Verbs. Dip, notice, answer, weigh, order, swim, visit, save, excuse, soak, skip, believe, crow, handle, start.

Adjectives. New-fashioned, all right, comfortable, windy, hearty, tiny, mad, Greek, broad, silver, tin, iron.

Adverbs. Comfortably, indoors, crosswise.

Pronoun. Mine.

Preposition. Upon.

TABLE D

PARTS OF SPEECH BY MONTHS

	Interj.	Prep.	Conj.	Adv.	Adj.	Pro.	Nouns	Verbs	Totals
9	..	..	..	..	..	..	1	..	1
10	..	..	..	..	..	..	2	..	2
11	..	..	..	..	..	..	3	..	3
12	..	..	..	..	..	..	1	..	1
13	..	..	..	..	..	..	4	..	4
14	1	..	..	4	1	..	11	4	21
15	..	..	..	..	3	..	40	4	47
16	..	..	..	..	2	..	17	4	23
17	..	..	..	1	6	..	26	16	49
18	..	..	1	1	6	..	34	14	56
19	..	7	..	2	9	1	47	21	87
20	..	5	..	6	4	2	46	26	89
21	1	3	..	12	13	3	42	17	91
22	..	..	..	1	1	6	16	5	29
23	..	1	..	5	9	1	48	20	84
24	..	2	..	6	9	2	40	21	80
25	1	2	1	5	14	1	62	26	112
26	..	1	3	6	11	7	78	16	122
27	..	1	..	3	12	1	36	15	68
Totals	3	22	5	52	100	24	556	209	969

TABLE E

PERCENTAGES BY MONTHS

	Interj.	Prep.	Conj.	Adv.	Adj.	Pro.	Nouns	Verbs	Totals
9	..	..	..	..	..	..	100	..	100
10	..	..	..	..	..	..	100	..	100
11	..	..	..	..	..	..	100	..	100
12	..	..	..	..	..	..	100	..	100
13	..	..	..	..	..	..	100	..	100
14	5	..	..	19	5	..	52	19	100
15	..	..	..	..	6½	..	85	8½	100
16	..	..	..	..	9	..	74	17	100
17	..	..	..	2	12	..	53	33	100
18	..	..	2	2	10½	..	60½	25	100
19	..	8	..	2	10	1	54	25	100
20	..	5½	..	7	4½	2	52	29	100
21	1	3⅓	..	13	14⅙	3⅓	46⅔	18½	100
22	..	..	..	3½	3½	20⅔	55	17⅓	100
23	..	1¼	..	6	10¾	1¼	57	23¾	100
24	..	2½	..	7½	11	2½	50½	26	100
25	1	1⅔	1	4½	12½	1	55⅓	23	100
26	..	¾	2½	4¾	8¾	5¾	64½	13	100
27	..	1½	..	4½	17½	1½	53	22	100

Summary

	Interj.	Prep.	Conj.	Adv.	Adj.	Pro.	Nouns	Verbs	Totals
24 mos.	2	18	1	38	63	15	380	152	657
27 mos.	3	22	5	52	100	24	556	209	969

Percentages

24 mos.	⅓	2⅔	0	5⅔	9⅓	2⅓	56⅓	23⅓	100
27 mos.	⅓	2¼	½	5½	10	2½	56⅔	22¼	100

THE ERUPTION OF THE TEETH AS A PHYSIOLOGICAL STANDARD FOR TESTING DEVELOPMENT

By Robert Bennett Bean,
The Anatomical Laboratory, the Tulane University of Louisiana

The data:	630	Filipino boys	776
	146	Filipino girls	
	322	German boys	628
	306	German girls	
	407	American boys	817
	410	American girls	
			2,221

Materials

During the school term of 1906-07 I examined and measured every available child in the public schools of Ann Arbor. This was made possible through the coöperation of Dr. McMurrich, the superintendent of schools, and the teachers, who showed commendable zeal in furthering the work. The teeth of the children were examined by Dr. Bunting who also assisted me in making the records. Two groups of children were segregated, the one of American parentage solely, the other of German, or American and German parentage. The titles American and German will be used for the two groups. When taken together the German and American children will be called European. Children were grouped as German if two grandparents or if either parent came from Germany and whenever the name was German and the parentage was not given the child was included in the German group, although there were only a few records of this kind. There is a large colony of Germans both in the town of Ann Arbor and in the adjacent country and the majority of the Germans included in the records are of pure German extraction. A large number of children of the teaching staff at the University of Michigan are included in the American group and a large number of rural children are included in the German group. The whole lot of children may be called sub-urban.

The Manila school children were examined by myself in 1907-08 at the Normal and Trade schools, where pupils from all parts of the Philippine Archipelago come to educate themselves as teachers and mechanics, carpenters, etc. The young children attend classes taught by the older ones at the Normal School and are necessarily from Manila and vicinity. The majority of the children are mestizos, mixed Spanish, Chinese and Filipino, and represent the littoral population of the archipelago fairly well. A few individuals are probably of pure Spanish extraction. No attempt was made to segregate the mestizos or those of Chinese or Spanish extraction from the presumably pure Filipinos because any such attempt is necessarily imperfect and will be so until we understand better than we do at present the workings of Mendelian heredity in man.

Methods

The age of the children was obtained from each individual and verified as far as possible through the teachers. In Manila the school registers were also examined and the age verified in this way. Discrepancies occur in spite of all efforts to avoid them, but I believe nearly all the ages are exact, and the few that may not be are approximately correct. The year and month of birth were obtained in all except a few instances and the child reckoned to be a certain age if it was anywhere within six months of that age. For instance, if a child was born in January, 1902, and the records were made in July, 1908, the child was recorded as six years old, but if the records were made in July, 1907, the child was recorded as five years old, and if the records were made in August, 1908, the child was recorded as seven years old. This method is practically the same as obtaining from the child the nearest birthday, although in giving that the child is apt to miscalculate.

The youngest children whose teeth I examined were five years old, and at that age all of the temporary teeth have erupted; therefore the time of the eruption of the temporary teeth cannot be given.

The Eruption of the Permanent Teeth

This is determined by taking the average or mean number of teeth erupted or erupting at each age, as well as the "median," the "mode," and the "extremes."

The eruption of the permanent teeth begins about the age of 5 years, slightly earlier among the girls and slightly later among the boys of the German and American groups, but considerably earlier than this (Tables 1-6) among the Filipinos of both sexes. The Germans and Americans of both

The Beginning of Eruption and the End of Eruption of the Permanent Teeth

Table 1. *Filipino Girls*

	Upper		Lower	
Teeth	Begin	End	Begin	End
Median Incisors	before 5	5 to 9	before 5	5 to 9
Lateral Incisors	before 5	5 to 9	before 5	5 to 9
Canines	5 to 9	12 to 13	before 5	5 to 9
Median Premolars	10 to 11	12 to 13	5 to 9	12 to 13
Lateral Premolars	10 to 11	12 to 13	10 to 11	12 to 13
First Molars	before 5	5 to 9	before 5	5 to 9
Second Molars	10 to 11	14 to 15	5 to 9	12 to 13
Third Molars	12 to 13	?	14 to 15	?

Table 2. *Filipino Boys*

	Upper		Lower	
Teeth	Begin	End	Begin	End
Median Incisors	before 5	5 to 9	before 5	5 to 9
Lateral Incisors	before 5	11	before 5	10
Canines	before 5	11	before 5	11
Median Premolars	5 to 9	14	5 to 9	14
Lateral Premolars	5 to 9	15	5 to 9	15
First Molars	before 5	10	before 5	12
Second Molars	5 to 9	14	5 to 9	14
Third Molars	13	?	13	?

Table 3. *American Girls*

	Upper		Lower	
Teeth	Begin	End	Begin	End
Median Incisors	6	9	5	8
Lateral Incisors	7	12	6	9
Canines	9	15	8	13
Median Premolars	8	13	9	14
Lateral Premolars	8	14	9	15
First Molars	6	8	5	8
Second Molars	10	15	10	16
Third Molars	16	?	16	?

Table 4. *American Boys*

	Upper		Lower	
Teeth	Begin	End	Begin	End
Median Incisors	7	9	6	8
Lateral Incisors	7	11	7	10
Canines	10	14	9	13
Median Premolars	8	16	9	14
Lateral Premolars	9	16	8	16
First Molars	6	9	6	8
Second Molars	12	16	11	17
Third Molars	?	?	?	?

Table 5. *German Girls*

	Upper		Lower	
Teeth	Begin	End	Begin	End
Median Incisors	7	10	5	9
Lateral Incisors	7	11	7	10
Canines	8	15	8	12
Median Premolars	8	13	8	14
Lateral Premolars	8	14	9	15
First Molars	5	7	5	8
Second Molars	11	16	10	14
Third Molars	?	?	14 or 16?	?

Table 6. *German Boys*

	Upper		Lower	
Teeth	Begin	End	Begin	End
Median Incisors	6	11	6	11
Lateral Incisors	7	11	7	10
Canines	10	14	10	14
Median Premolars	8	14	10	14
Lateral Premolars	9	14	10	14
First Molars	6	9	6	7
Second Molars	11	16	10	16
Third Molars	?	?	?	?

sexes have almost exactly the same number of permanent teeth at the ages of 6, 7 and 8 years, after which the girls have a greater number of teeth than the boys until the age of 15 is reached, when the number of teeth in the two sexes is again about the same. The correlation of the eruption of the teeth and of the growth in stature of the sexes is close.

The girls of each group are more precocious in the eruption of the permanent teeth than the boys; they have a greater number of permanent teeth at each age, and the difference is greatest between the ages of 8 and 15 years, for at the age of 11 years the American girls have an average of 21.3 permanent teeth present, and the American boys have an average of only 17.3. The difference between the German boys and girls at this age is not so great, and they have only 16.7 and 19.5 teeth present for the boys and girls respectively. The difference between the Filipino boys and girls is still less, and they have a greater number of teeth present than either the German or Americans at the age of 11 years, 24.3 and 27.0 for the boys and girls respectively.

The Filipinos are much more precocious than either the Germans or Americans in the eruption of the permanent teeth, and there is little difference between the boys and girls in the number of teeth present at each age. The Americans are a little more precocious than the Germans in the eruption of the permanent teeth, and the difference between the boys and girls is greater among the Americans than among the Germans or Filipinos.

About the age of 15 years the children of both sexes in all the groups have nearly the same number of teeth, and after this age the German and American children maintain the same number of teeth up to the time at which the records cease (18 years), but the Filipino children continue to gain in the number of their teeth to the age of 20 and beyond, although the majority of the Filipinos have acquired the complete set of 32 teeth at the age of 20 years.

This is due to the early eruption of the third molars in the Filipinos, beginning at 13 years, and their later eruption in the Germans and Americans beginning at 16 years or later.

Sixty odd negro boys and girls, mostly mulattoes, were examined at Ann Arbor, and it is found that the negro boys and the American boys are almost parallel in the time of the eruption of their teeth, and the negro girls are only slightly more precocious than the American girls.

The Time at which Approximately 50% of Each Type of Tooth is Erupted

It is impossible to calculate exactly when 50% of the teeth are erupted, but approximate ages may be obtained for each type of tooth, which has been done and the results placed in Table 7.

Median Incisors. The lower median incisors erupt about the age of 6 years, and the upper at about the age of 7.5 years. This is the time of eruption in the American boys; it occurs earlier in the Filipino boys and later in the German boys, and the sexual differences are slight.

Lateral Incisors. The lower lateral incisors erupt about the age of 8 years and the upper lateral incisors erupt about the age of 8.5 years. They erupt only a little earlier in the German boys than in the German girls, but there is six months' difference in time between their eruption in the American girls and boys, the girls being earlier than the boys.

The upper lateral incisors erupt at about 8.5 years in the Filipino boys, and in the American and German girls, but at 9 years in the American boys and at 8 years in the German boys. The order of eruption of the lower lateral incisors is (1) Filipino boys, (2) American girls, (3) German girls, (4) German boys and (5) American boys.

Canines. The upper canines erupt at about 11.5 years of age, and the lower at about 10.5, except in the Filipinos where the eruption is at about 8 years for the uppers and 7 years

Table 7. *The physiological standard* (see page 610) *or the period of most rapid eruption of the permanent teeth, and the time at which* 50% *are present*

Teeth	Amer. girl	Ger. girl	Amer. boy	Ger. boy
Lower first molars	5–6 yrs.	6–7 yrs.	6–7 yrs.	6–7 yrs.
Upper first molars	5–6 “	6–7 “	6–7 “	6–7 “
Lower median incisors	5–6 “	6–7 “	6–7 “	6–7 “
Upper median incisors	7–8 “	7–8 “	7–8 “	7–8 “
Lower lateral incisors	7–8 “	7–8 “	7–9 “	7–9 “
Upper lateral incisors	8–9 “	7–9 “	8–10 “	8–9 “
Upper median premolars	9–11 “	9–11 “	10–11 “	10–12 “
Lower canines	9–11 “	10–11 “	11–12 “	11–12 “
Lower median premolars	9–11 “	10–11 “	10–12 “	11–12 “
Upper lateral premolars	10–11 “	10–11 “	10–12 “	10–12 “
Upper canines	10–11 “	10–12 “	11–12 “	11–12 “
Lower lateral premolars	10–11 “	11–12 “	11–12 “	10–13 “
Lower second molars	10–12 “	11–12 “	11–14 “	11–14 “
Upper second molars	12–13 “	12–13 “	12–14 “	11–14 “

	Filipino boys	Filipino girls
Lower canines	5–9	?
Upper canines	5–9	?
Upper median premolars	5–10	?
Upper lateral premolars	7–11	?
Lower median premolars	10–11	?
Lower lateral premolars	10–11	?
Lower second molars	10–11	7–11
Upper second molars	10–11	7–13
Lower third molars	17–18	16.5–18.5*
Upper third molars	17–20	16.5–18.5*

* 50% of the Filipino girls do not have the third molars erupted until after 20 years.

for the lowers. The order of eruption of the upper canines is 1) Filipino boys, 2) Filipino girls, 3) American girls, 4) German girls, 5) American boys and 6) German boys. The notable exception to the general rule is that the Filipino boys are more precocious than the Filipino girls, although this may not be of great significance because so few Filipino girls were recorded. The order of eruption of the lower canines is 1) Filipino girls and boys, 2) American girls, 3) German girls, 4) American boys, 5) German boys. The girls' canines erupt six months earlier than the boys', and the American girls' canines erupt more than a year earlier than the American boys'.

Median Premolars. The upper median premolars erupt at about 10 years of age and the lower at about 11, except among the Filipinos where the eruption is a year earlier for the boys and two years earlier for the girls. The order of eruption is the same for the upper and lower median premolars, 1) Filipino girls, 2) Filipino boys, 3) American girls, 4) German girls, 5) American boys, 6) German boys, which is the usual order of eruption.

Lateral Premolars. The upper lateral premolars erupt at about 11 years of age, and the lower lateral at about 11.5, except among the Filipinos, where the boys' erupt, the upper at 9, the lower at 10.5; the girls', the upper at 10 and the lower at 10.

The order of eruption is, 1) Filipino boys and girls, 2) American girls, 3) German girls, 4) American boys, 5) German boys, the upper and the lower with the same order.

First Molars. The first molars erupt near the age of six years in all the groups except the Filipino boys where the age is six for the upper but five for the lower molars. There are so few Filipino girls on record that the eruption of the upper first molars among them at 7.5 years should not be considered. There is very little difference in time between the eruption of the upper and lower teeth. The American girls are slightly precocious and the German boys slightly backward in the eruption of the first molars.

Second Molars. The upper second molars erupt at about the age of 12.5 years and the lower at about 12, except among the Filipinos where the time of eruption is 10 for the girls and 10.5 for the boys, both upper and lower. The order of eruption is the usual one in the sexes and races.

Third Molars. The time of eruption of the third molars can be given only for the Filipinos, in whom it occurs about the age of 19 years.

From Table 7 we may construct the plan of the left side of a mouth in which the teeth are arranged as they would appear were we looking into the mouth, and inside of the symbol for each tooth put the number that represents the order of its eruption.

Plan of the order of eruption of the Filipinos' teeth (girls below ten not included):

Med. Inc.	Lat. Inc.	Canines	Med. Prem.	Lat. Prem.	1 Mol.	2 Mol.	3 Mol.
3	5	4	⑥	⑦	2	8	10
1	3	3	⑦	⑧	1	8	9

Plan of the order of eruption of the Germans' and Americans' teeth:

Both sexes	Med. Inc.	Lat. Inc.	Canines	Med. Prem.	Lat. Prem.	1 Mol.	2 Mol.	3 Mol.
	4	6	11	⑦	⑩	3	14	16
	2	5	8	⑨	⑫	1	13	15

Resumé. The usual sex-race order of the eruption of the teeth is, 1) Filipino girls, 2) Filipino boys, 3) American girls, 4) German girls, 5) American boys, 6) German boys, as determined by the time at which approximately 50% of the teeth have erupted.

By the same standard the order of the eruption of the types of teeth for the Germans and Americans is, 1) first molars, 2) median incisors, 3) lateral incisors, 4) median premolars, 5) canines, 6) lateral premolars, 7) second molars, 8) third molars.

All the lower teeth erupt before the upper except the premolars.

The time of the eruption of the canines is of interest, especially among the Filipinos, in which the canines erupt before the eruption of the upper lateral incisors. The order of eruption of the canines in relation to that of the premolars among the Germans and Americans is, 1) upper median premolar, 2) lower canine, 3) lower median premolar, 4) upper lateral premolar, 5) upper canine, 6) lower lateral premolar.

The work of Chérot(5) is of value because it is of recent date, and because he procured data from 20 to 30 children of each sex at each age. The time of the *beginning of eruption* and of the *end of eruption* as he found them in the French may be compared with my records of the Ann Arbor children:

Table 8. *Percentage of each tooth erupted at a given age*

	Chérot—French				Bean—Ann Arbor			
Upper first molars......	12.19%	at 5 yrs.	100%	at 8	6.25%	at 5	94.5%	at 8
Lower first molars......	19.51	"	100	"	18.75	"	97.5	"
Upper median incisors..	0.0	"	100	at 9	0.0	"	91.6	at 9
Lower median incisors..	2.43	"	100	"	6.25	"	98.5	"
Upper lateral incisors ..	0.0	at 6 yrs.	100	at 10	0.0	at 6	83.5	at 10
Lower lateral incisors ..	2.27	"	100	"	1.5	"	96.5	"
Upper median premolars	2.5	at 7 yrs.	100	at 13	0.0	at 7	92.5	at 13
Lower median premolars	2.5	"	100	"	0.0	"	96.0	"
Upper lateral premolars.	2.38	at 8 yrs.	97.05	"	0.75	at 8	85.25	"
Lower lateral premolars.	4.76	"	100	"	0.325	"	83.5	"
Upper canines.........	0.0	"	97.05	"	1.0	"	80.4	"
Lower canines.........	4.76	"	100	"	2.88	"	97.1	"
Upper second molars...	8.51	at 10 yrs.	100	at 14	0.25	at 10	78.9	at 14
Lower second molars...	12.76	"	100	"	4.12	"	91.1	"
Upper third molars.....	19.5 years				1.75	at 16		
Lower third molars.....	19.5 years				3.5	"		

It is to be seen from Table 8 that the French children are earlier than the children of Ann Arbor both in the *beginning of eruption* and in the *end of eruption* of the teeth, except in the *beginning of eruption* of the lower median incisors and upper canines; wherefore it is evident that the French at any age are more mature in the eruption of the teeth than the children of Ann Arbor.

Chérot believes there are four periods of acceleration in the eruption of the permanent teeth—from six to eight and a half years, when some teeth are erupting all the time; from 10 to 11 years; at 12 years; and about 20.5 years, during the eruption of the third molars. The periods of 10 to 11 and at 12 should be combined because they run together, thus leaving three periods, which have been associated by others with the eruption of the three series of molar teeth. Welcker (16) gives the time of eruption of the permanent teeth for the Germans as follows:

First molars, 7 years.
Median incisors, 8 years.
Lateral incisors, 9 years.
Median premolars, 10 years.
Canines, 11 to 13 years.
Lateral premolars, 11 to 15 years.
Second molars, 13 to 16 years.
Third molars, 18 to 30 years.

The German are more backward than the French, which reminds us that the Germans of Ann Arbor are more backward than the Americans of the same place in the eruption of the permanent teeth.

Hrdlicka (10) has published the only detailed data of the examination of children's teeth that I have been able to find in the literature. He examined the teeth of the Apache and Pima Indians of North America, and from his records he concludes that the teeth of the Indians appear at about the same ages as the teeth of the whites, with the exception of the canines and second molars, which apparently erupt earlier in the Indians than in the whites. I have calculated the *beginning of eruption* and the *end of eruption* of the teeth in the Indians, which is based on the stature rather than the age, because the age of the Indians was not obtained by Hrdlicka. The age is calculated from the stature by Hrdlicka, and he remarks that it is doubtless imperfect.

The order of eruption is similar to that of the Europeans or white peoples, and different from that of the Filipinos, because in the latter the canines erupt before the premolars, whereas in the others the canines erupt at the time of the

Table 9. *The eruption of the teeth in the Indian*

	Male		Female	
Teeth	Begin	End	Begin	End
First molars	5.2	7	5.6	6
Median incisors	6.2	7	5.6	8.5
Lateral incisors	7	10	7.2	9.5
Median premolars	7.8	13	7.2	13
Lateral premolars	8.6	14.4	7.4	13
Canines	9	13	7.8	13
Second molars	9.5	13	9.3	13.8
Third molars	16.5	...	14	...

eruption of the premolars, or as noted above; the lower canines erupt between the eruption of the upper and lower median premolars and the upper canines erupt between the eruption of the upper and lower lateral premolars.

The eruption of the teeth begins later in the Indians than in the whites, and ends earlier. The teeth of the Indians erupt more promptly than those of the whites, and the canines, second and third molars erupt earlier in the Indians than in the whites.

Boas (4), and Boas and Wissler (3) have made reports as to the eruption of the permanent teeth in American whites but their work has been inaccessible to me and what I give is based on abstracts. Boas published the following results in *Science* recently with the remark that they "are not very accurate."

	Age in years			
	Boys		Girls	
Teeth	Boas	Bean	Boas	Bean
Inner permanent incisors	7.5	7.0	7.0	6.65
Outer permanent incisors	9.5	8.4	8.9	8.00
Bicuspids	9.8	11.1	9.0	10.6
Canines	11.2	11.6	11.3	10.5
Second molars	13.2	12.6	12.8	12.0

I do not know how the calculations were made by Boas but when compared with my results of the time when approximately 50% of the teeth are erupted, his records show a retarded eruption of all the teeth except the premolars, which are precocious, and erupt more than a year earlier than the premolars of the Germans and Americans of Ann Arbor. The canines in his records erupt about two years later than the "bicuspids" (premolars?), which is very unusual. Boas and Wissler also place the end of eruption of the permanent teeth as follows: First molars, 9 years; median incisors, 12 years; bicuspids, 6-12 years; canines, 6-15 years; lateral incisors, 15 years; and second molars, 7-15 years.

Morphologic Form and Teeth

In a former study of Filipino students (1 and 2) I called attention to the bad teeth of what I then called the Iberian type, but have since named the Hyper-onto-morph. This form is usually small, slender, narrow nosed, and has a long slender face with pointed chin, and a long narrow head with projecting occipital region, although at times the form may be fat, the face may be short and not slender, the nose may be stubby, and the head may be rounded; but at all times the form has characteristic ears, with everted anthelix, tragus and antitragus, and rolled back helix. The form is identical with the Mediterranean race of Sergi. In studies subsequent to those on the Filipino students, I made studies in Manila, in Taytay, a town near Manila, and in New Orleans, I have demonstrated that this form is what I call an epitheliopath, a form which is very susceptible to diseases of the structures derived from epithelium such as the lungs, alimentary canal and central nervous system. The Hyper-ontomorph is quite distinct from the round headed, round faced form with more or less infantile nose and bowl shaped ears which I call the Hypo-onto-morph. However, no observations were made of the ear form of the school children represented in this study, hence only the cephalic and facial indices, and the relative size of the occipital and parietal regions of the head can be utilized here. This will not effect a complete segregation of the Hyper-onto-morph and the Hypo-onto-morph, but it will indicate that a complete segregation such as might be accomplished by the use of the ear form and other factors would give a marked contrast between the two forms in the eruption of the teeth, in the number of good sets present, and in the average number of bad teeth. As it is, the segregation by cephalic and facial indices gives considerable difference in all three of these conditions.

The two forms are segregated by putting those with a cephalic index below 80 and a facial index below 120 in one group, and those with a cephalic index of 80 and over and a facial index of 120 and over in another, and the remainder or those with cephalic index of 80 and over and a facial index of less than 120, or with cephalic index of less than 80 and a facial index of 120 and over, in a third group. The three will be called the Hyper-onto-morph, Hypo-onto-morph and Remainder. Below the age of 11 years the dividing figure of the cephalic index is 81 instead of 80.

Permanent teeth erupted. The Filipinos from 5-10 years of age may be neglected because of the few individuals who come under observation. The average number of teeth erupted among the German and American boys from 5-10 years of age is

Hyper- 9.87 Hypo- 9.14 Remainder 9.45

The Hyper- is more precocious than the Hypo- from 5-10 years of age.

The average number of teeth erupted in all the groups from 11 to 16 years of age, including both sexes is

Hyper- 26.6 Hypo- 24.1 Remainder 25.4

The Hyper- is more precocious than the Hypo- from 10-16 years of age. It is therefore evident that the Hyper, at all ages, is more precocious in the eruption of the permanent teeth than the Hypo, and this difference amounts to one or more teeth.

Number of good sets of permanent teeth present. The Filipinos below the age of 10 years may be neglected as usual. The percentage of good sets of teeth among the Germans and American boys and girls from 5 to 10 years of age is

Hyper- 80.33 Hypo- 80.98 Remainder 82.8

The percentage of good sets of teeth among the boys and girls of all the groups from 11 to 16 years is

Hyper- 18.3 Hypo- 46.8 Remainder 34.4

Among the Filipinos alone from the age of 17-30, both sexes, it is

Hyper- 9.3 Hypo- 34.3 Remainder 24.2

It is evident that the Hyper- has fewer good sets of teeth at all ages than the Hypo.

Average number of bad permanent teeth per individual. The Filipinos below the age of 10 years may be disregarded. The average number of bad teeth below the age of 10 years among the German and American boys and girls is

Hyper- 0.468 Hypo- 0.36 Remainder 0.30

The average number of decayed teeth in all the groups from 11 to 16 years of age is

Hyper- 3.35 Hypo- 1.79 Remainder 2.09

The average number of decayed teeth among the Filipinos alone from 17 to 30 years of age is

Hyper- 3.33 Hypo- 2.53 Remainder 3.08

It is evident from a consideration of the average number of bad permanent teeth that the Hypers have the worst teeth and the Hypos have the best.

The number of individuals in each group. Racial differences may be found by calculating the relative number of Hyper and Hypo individuals in each group. Between the ages of 5 and 16 the Filipinos have 1 Hyper to 15.2 Hypos, the Germans have 1 Hyper to 5.3 Hypos, and the Americans have 1 Hyper to 1 Hypo. From 17 to 30 years the Filipinos have 1 Hyper to 3.8 Hypos.

Sexual differences may be determined in the same manner. The Filipino girls have 1 Hyper to 28 Hypos, and the Filipino boys have 1 Hyper to 4.6 Hypos; the German girls have 1 Hyper to 7.1 Hypos, and the German boys have 1 Hyper to 4.3 Hypos; and the American girls have 1 Hyper to 1.2 Hypos, and the American boys have 1 Hyper to 0.84 Hypos.

It is also noticed that the relative number of Hypers increases with age. This is especially noticeable with the American boys for whom the ratio is 1 Hyper to 3 Hypos at 8 years of age and 12 Hypers to 1 Hypo at 16 years of age.

Hyper-morphism is a condition of development in a certain direction, a condition of greater age, a male condition, and a condition characteristic of the American (white). Hypo-morphism is a condition of development in another direction, a condition of less age, a female condition, and a condition characteristic of the Filipino.

A number of other conditions besides the shape of the head and face characterize the Hyper and the Hypo forms, such as the shape of the nose, the size of the regions of the head, the ear form, etc., the relative lengths of the extremities and of their parts, but it will suffice to give only one of these here, that is, the relative size of the occipital and parietal regions of the head.

The circumference of the forehead, frontal, parietal and occipital regions of the head of the school children were taken but they will be reserved for future studies of head form that are at present under way; only the relative size of the occipital and parietal regions of the head to each other will be given here.

The points selected from which to measure the circumference of the regions of the head are the dorsal extremities of the middle roots of the zygoma on each side of the head immediately ventral to the external ear, a place that is easily accessible and distinctly felt. The tape was passed from the point on the right side to the point on the left side around the maximum protuberance of the parietal and occipital regions of the head, and this distance recorded as the circumference of the part. An index is obtained that is called the occipito-parietal index, by multiplying the occipital circumference by

100 and dividing by the parietal circumference. This gives the occipital circumference in terms of the parietal, the latter always being 100. A high index denotes a large occipital region, a low index the reverse.

The occipito-parietal index. The occipito-parietal index in the German and American children from 5 to 10 years of age is

Hyper 80.9	Hypo 79.9

and from 11 to 16 years of age is

Hyper 82.2	Hypo 79.4

The occipito-parietal index in the Filipino boys is

5 to 10 years......	Hyper 88.4 (1)	Hypo 78.3
11 to 16 years......	Hyper 81.9	Hypo 76.7
18 to 30 years......	Hyper 83.4	Hypo 79.9

The index of the Filipinos is less than that of the Germans and Americans at the same age, and the index of the Hypo in the Filipino from 17 to 30 years of age has reached that of the German and Americans at the age of 5 to 10 years, but the index of the Hyper among the Filipinos at 17 to 30 years of age has passed that of the Germans and Americans at the age of 11 to 16. The index increases with age except that the Hypos among the Germans and Americans do not change.

The Hypo has a relatively smaller occipital region in the Filipino than in the German, and a relatively larger occipital region in the American than in the German. The same is not true for the Hyper, for in them the occipital region is about the same for the American and Filipino, but relatively smaller for the German.

The sexual differences indicate that the male has a relatively larger occipital region than the female, and the female a relatively larger parietal region than the male although the difference is not great.

Magitot (13) called attention to the differences in the decay of the teeth in Normandy and Brittany, and attributed the difference to the type of people in the two compartments of France. In Brittany are the Celts or Gauls, who are small, with dark hair and eyes, and broad head, and with good teeth; in Normandy are the Belgians or Kymries, who are tall, with fair hair and eyes, and long head and with bad teeth. The color of hair and eyes seems to be incidental, because in those I examined with bad teeth and of the Hyper-onto-morph form, the color of hair and eyes was of all shades. In Southern Europe the long head has dark hair and eyes and in Northern Europe fair hair and eyes, and in Central Europe the broad head has dark hair and eyes, and in Eastern Europe the same form has fair hair and eyes. The morphologic form is independent of pigmentation and I believe the time of eruption of the permanent teeth and the extent of their decay are due to inherent differences in the morphologic form of the individual.

THE PHYSIOLOGICAL STANDARD

The foregoing pages have been written to demonstrate that the time of the eruption of the teeth, or of any tooth, varies with sex, with race, and with morphologic form, as well as with age, and it is necessary to bear in mind all the facts in using the eruption of the teeth as a physiological standard for testing development.

I offer a protest against the use of the term physiological age, and suggest in its place the term physiological standard, because any age may be a physiological age, and all ages are physiological unless they are pathological. What is usually meant by the physiological age is, I suppose, the relative development of the individual as measured by some standard other than age. It is therefore illogical to use the term age when age is not meant.

No single factor, such as stature, or weight, or the epiphyses of the bones, or the eruption of the teeth, or the presence or absence of secondary sexual characters, or any other factor will be sufficient alone to establish the relative development of the individual, although one factor may be worth more than another in this respect, and I shall attempt to show the value of the time of eruption of the permanent teeth as a physiological standard in the determination of the relative development.

The various structural parts, or organs, of the body do not develop synchronously, but by comparing the periods of acceleration and retardation in the growth of the skeleton with the periods of acceleration and retardation in the development of the permanent teeth, taken as a whole, and by further considering individual teeth, and also the work on general development by Donaldson, Jackson, Hatai and others (6, 9, 11, 12 and 15), I have arrived at a law which may be expressed as follows:

There are one or more periods of acceleration alternating with periods of retardation in the development of any one of the structures of the body. The periods of acceleration in the development of one structure may be synchronous with the periods of retardation in the development of another structure.

Thus the period of the first six months after birth is one of rapid growth in body length, and this is followed by a period of comparative rest of the body while the eruption of the temporary teeth is taking place, all of which are through the gums by the third year. This activity in dental growth is followed by a period of rest. Following this there is a second period of rapid growth in length (stature), subsequent to which the permanent teeth begin to erupt, after which the growth of the body is again accelerated, to be followed by a second rapid eruption of the permanent teeth, and then another rapid growth of the body which is succeeded by puberty.

The lower extremities develop most rapidly from birth to 6.5 years, according to Godin (8 and 15), and they develop more rapidly than the trunk from 6.5 to 15.5 years, after which, from 15.5 to 17.5 years, the trunk develops more rapidly than the lower extremities. The great factor in the increase of stature from birth to 15.5 years is the growth in length of the lower extremities; therefore the periods of acceleration and retardation of growth refer primarily to the long bones. The development of the teeth and of the long bones are therefore reciprocal; the periods of acceleration in the development of one correspond to periods of retardation in the development of the other. In the consideration of the eruption of the permanent teeth it is necessary to bear in mind the periods of acceleration and retardation in their development, the earlier the beginning of the periods of acceleration the more precocious the child. The periods of acceleration in the development of the permanent teeth begin necessarily before the periods of most rapid eruption; the eruption of the teeth is merely the consequence of their previous rapid development.

Each tooth may be considered from the standpoint of the time at which it first appears in any individual of a group, and the time at which it last appears in any individual, as well as from the time at which 50% of the individuals have the tooth erupted, and the time during which the greatest number of individuals have the tooth erupting. Suppose we take the left upper second molar tooth in the American girls (Table 3). This tooth has not erupted in any American girl at 9 years of age, but 2% appear at 10 years, and the latest age at which any erupt is 15 years; all are erupted at 16 years. Approximately 50% have the tooth erupted at 12 years; therefore there is a shorter period for the eruption of the first 50% (10-12 years) than for the eruption of the second 50% (12-15 years). The greatest number of teeth erupt between 11 and 12 years (41%), although there is a second period of rapid eruption between 13 and 14 years. This may be a segregation of the precocious and backward American girls.

In like manner we may obtain the same data for all the other teeth of the American girls, and of the teeth of all the other boys and girls. The upper teeth of the same type on the two sides, as the upper median incisors or the upper second molars, erupt at so nearly the same time that they may be put together. The period of most rapid eruption almost invariably coincides with the time at which 50% of the teeth have erupted; therefore the limits of the first-mentioned period will cover the second. A table may be constructed showing the results, and this table will be the physiological standard for each group of individuals in relation to the eruption of each tooth (see Table 7). The ages given are the ages at which the teeth normally appear. If the teeth appear earlier in any individual, that individual is precocious; and if later, backward. See Tables 1-6, from which the data for Table 15 are taken.

The physiological standard may be utilized to greater advantage with increasing age, because the racial and sexual differences increase with age. A word as to one way in which the table may be of use. Take a German girl of 10 years, when all the incisor teeth, the first molars, premolars and canines may be erupted; and a German boy, who may not have all these teeth erupted until 11 years of age; yet at 11 years he may be at the same physiological standard as the girl at 10 years. Should either one have all the teeth mentioned before the age specified, there would be evident precocity. In like manner evident backwardness may be determined.

The teeth are more convenient and more exact as a means of determining the physiological standard than stature, or weight, or the growth of the bones, or secondary sexual characters, etc., and they may be of greater value than any other means that can be utilized. The teeth can be seen, counted and identified by almost anyone after a little experience, and they are either present or absent, therefore very definite.

Precocity in the eruption of the permanent teeth is a sign of Hyper-morphism, and Hyper-ontomorphs are epitheliopaths, who are especially susceptible to diseases of the alimentary canal, the lungs and the central nervous system; therefore precocious children should be shielded from injuries to the susceptible organs.

Backwardness in the eruption of the permanent teeth is a sign of Hypo-morphism, and Hypo-ontomorphs, too, are probably susceptible to diseases of organs other than those mentioned, and they should be shielded from injuries to the susceptible organs.

The School Grade for Each Year of Age. Mode

The modal grade, or the grade that has the greatest number of individuals at each age, varies little with sex, but the Germans are about one year behind the Americans. This corresponds with the backwardness of the Germans in the eruption of the permanent teeth, and indicates considerable correlation of mental and dental development. This is true not only of the modal grade, but also of the grades above and below the mode. At each age from 7 to 14, inclusive, the children who are below the modal grade have an average of 0.9 of a tooth less than those in the modal grade, and the children who are above the modal grade have an average of 0.8 of a tooth more than those in the modal grade. The difference is greatest at 10 and 11 years, when the second period of the second dentition is at its height, and the difference at these two ages amounts to 1.5 and 1.8 teeth for those below and above the mode respectively.

It will be recalled that there is a period of one year during which the greater number of teeth of any form erupt, and during this year in nearly every case 50% of that form of tooth has erupted. From this a physiological standard, or age of eruption of each tooth, was determined. Evidence is therefore produced to indicate that the eruption of the teeth is a better criterion than age as a standard of both physical and mental development.

This evidence is not conclusive for each individual but only as an average or modal factor, because some individuals with fewer teeth than normal are above the modal grade, and some individuals with more teeth than normal are below the modal grade. Other factors therefore play a part and must not be overlooked. For instance, one child who was advanced in school grade beyond her age, and who had less than the normal number of teeth present, was the child of a teacher, and had evidently been pushed in school work.

However, the condition of the teeth, both as to eruption and decay, may be utilized and may be of value in determining the relative development of the individual.

BIBLIOGRAPHY

1. BEAN, ROBERT BENNETT. Filipino Types. I. Manila Students: An attempt to classify the littoral population of Luzon and adjacent islands. The Philippine Journal of Science, Vol. IV, No. 4, section A, General Science. July, 1909.
2. —— ——. The Racial Anatomy of the Philippine Islanders. J. B. Lippincott Co., 1910.
3. BOAS, FRANZ, and WISSLER, CLARK. Statistics of Growth. Report of U. S. Commissioner of Education for 1904, Wash., 1905.
4. BOAS, F. The Growth of Children. Science, N. S. Vol. XXXVII, No. 937. p. 815-818. Dec. 13, 1912.
5. CHÉROT, J. Etude statistique sur l'eruption des dents et leur age d'apparition. 8°. Paris, 1911.
6. DONALDSON, H. H. An analysis of growth. Trans. 15th International congress on Hygiene and Demography. Wash., 1913.
7. Economy of time in education. U. S. Bureau of Education, 1913.
8. GODIN, PAUL. Recherches anthropométriques sur la croissance des diverses parties du corps. Determination de l'adolescent type aux differents ages pubertaires d'apres 36,000 mensurations sur 100 sujets suivis individuellement de 13 à 18 ans. Paris, 1903. Prix Broca.
9. HATAI, SHINKISHI. On the weights of the abdominal and the thoracic viscera, the sex glands, ductless glands, and the eyeballs of the albino rat (mus norvegicus albus), according to body weight. The American Journal of Anatomy, Vol. 15, No. 1, July 15, 1913.
10. HRDLICKA, ALES. Physiological and medical observations among the Indians of southwestern United States and Mexico. Bureau of American Ethnology, 1908.
11. JACKSON, C. M. On the prenatal growth of the human body and the relative growth of the various organs and parts. The American Journal of Anatomy, Vol. IX, p. 119-166. 1909.
12. —— ——. Postnatal growth and variability of the body and of the various organs in the albino rat. The American Journal of Anatomy, Vol. 15, No. 3, July 15, 1913.
13. MAGITOT, M. Recherches ethnologiques et statistiques sur les altérations du système dentaire. Bull. de la soc. d'anth. de Paris, 1867. p. 71-105.
14. MAGITOT, E. Des lois de la dentition (études de physiologie compareé). J. de l'anat. et physiol., etc. Paris, 1883, XIX, 59-102.
15. PFITZNER, W. Social-Anthropologische Studien, Zeit. für Morph. u. Anth. 1899, 1901, 1902, 1903. I. Der Einfluss des Lebenaltes. II. Der Einfluss des Geschlechts. III. Der Einfluss der sozialen Schichtung (und der Konfession) auf die anthropologischen Charakter. IV. Die Proportionen des erwachsenen Menschen.
16. WELCKER, HERMANN. Archiv. f. Anthropol. I. 114, 1866, 89-160. Kraniologische Mittheilungen.

THE FIRST RUSSIAN TEACHERS' CONGRESS

A Letter from Russia by Marie Lewitin

After many attempts the administration allowed the first Teachers' Congress to meet in Petersburg. In our country we have no right to hold meetings even on educational matters, without obtaining permission beforehand from the police and showing them the detailed program. This goes back to the Revolution of 1905. At that time the teachers were a very active element. Nearly all the elementary school teachers took part in it, as they were usually connected with the poorer classes both in town and country and thus suffered most under the reactionary Russian regime both as educators and as poorly paid workers. Their Congress and meetings in 1905 ended in very radical resolutions on political and social matters and their professional organizations also agitated and acted radically. Then came the reactionary period. From 1907-1910 all their organizations were closed, their members sent to prison or Siberia, and thousands lost their positions. There was an extirpation of all the active, intelligent elements, particularly in the country schools.

After such a revenge, such a "clearing out" of teachers, we could not hope for the First Congress to show us anything active, radical or new. Perhaps the Government had the same expectation in allowing it. But here we were deceived. In all sections of the Congress, which numbers more than seven thousand members, almost all elementary school teachers, were masses of young, hopeful teachers, both men and women, radical as to methods and all professional and organization problems. The reactionary views expressed later show this: Teachers are revolutionists. They must be "persuaded." And as a matter of fact even those teachers who spoke only on methods are now looked on as "bad elements" by school directors and inspectors and have, in some instances, been removed from the schools.

The Congress lasted twelve days of the Christmas season and as it met in five sections it is difficult to give a brief account of it and I must characterize only the more interesting events and questions discussed.

Before taking up the question of manual training in the Congress, I should explain the *status quo* in Russian schools in questions of method. Although Russia is behindhand in culture, the pedagogical publications have, for the last ten or fifteen years, begun to take up and throw light upon the important educational occurrences, theories and problems both at home and abroad. The press has become a real leader in culture, which,—in contrast to the summer courses offered to teachers—instructs them in new movements and theories. The Russian teacher, even in the distant country schools, is accustomed to think about books and reading and so he becomes acquainted with new problems, but all these "good things" are likely to remain a little theoretical, unpractised and not understood. Therefore the two sections of the Congress on methods were always crowded and the discussions were interesting from the general point of view as well as the practical.

The regular program of both our elementary and high schools for developing the child mentally and physically, is a very old one. He is, as always, taught reading and writing, in the elementary school, and a little geography and history in the high school, such as the classical and real gymnasia. This large program is usually carried out very abstractly, with much book study and little practice and work. Naturally, there are some private schools which use newer methods, and some other schools here and there in which teachers are beginning to introduce manual training, drawing and modelling. These are now in many high schools, but without any correlation with the rest of the program.

On account of the importance of manual training the discussions were detailed and the meetings popular. In the general discussion following the papers many country school teachers took part, showing a remarkable state of affairs. Side by side with teachers who, in their far-off little villages, tried new methods and gave enthusiastic accounts of their work, were others, very radical in questions of organization, but much afraid of the new schools and methods. They said, "We are poor and unorganized; we have not even fundamental rights; we live like dogs; education is not compulsory and how can we try these new methods when we do not know the detailed program and object?" Here we see the effect of the lack of freedom of the Russian people. Teachers brought up under the advice and circulars of inspectors can not free themselves from the yoke, so that even when discussing the methods of a new free school system they call for an exact program and advice. It was therefore necessary to adopt the following conciliatory resolution: "In order to realize the principle of the harmonious development of the child the Second Section deems it necessary to reform the school organization so as to base it on the best adaptation of the principle of manual work in education. This principle is to be understood as a necessary factor in the general education of every individual and all efforts to give to the elementary school a professional or industrial character must be rejected. Teachers who are introducing this principle should insist upon general culture as the inviolable basis of the elementary school."

The second part of this resolution can only be understood by a reference to a new statement in the program of elementary education by means of which the Administration, the reactionary element in the country schools and some professional school teachers tend to give an industrial character to elementary education, and to turn the schools into trade schools. Many teachers do not understand the difference between manual work as a trade and as an educational principle. The first has no place in elementary teaching while the second should be the first principle and foundation of all modern education. It was necessary therefore to make clear to the Congress as well as to all others, that the pedagogical principle is entirely different from the reactionary tendency. We should and will develop children both physically and mentally but we will not make them factory hands from their very childhood. This is the proper work of industrial or trade schools and courses, which should come as a higher step after elementary education and should be organized everywhere.

The sections also voted that programs should be adapted to local conditions and teaching made more concrete and sensory. "The need which the working class has of knowledge of how to live can be satisfied by acquainting pupils with the occurrences in nature and in human life going on about them. This adaptation of the program to the conditions of the child's life should be the outcome of cooperation between the agencies of self-government (*Semstwo*) and the teachers' colleges, which should meet together at regular intervals both in town and country." All the sections came to an agreement on this but not without a struggle with the partisans of more vocational or trade training.

They were not of the same opinion however, on the question of the program. The Second Section wished to see the program enriched not by adding history, geography and natural science as separate subjects, but by teaching all together as one " science of nature." Other sections however, wished them to be distinct school subjects, and so a decision on this important problem had to be postponed to the Second Congress.

As to problems of punishment and discipline, there was a surprising condition. In a country where to-day physical punishment is used in a very severe and awful manner, the teachers do not and will not use it. The idea of free government has become very popular. Naturally, in conditions of servitude it can not be quickly realized and physical punishment is not entirely done away with in poor families, though it is in schools and free government is more and more understood in educational circles. In the Second Section there was a report on a questionnaire given to elementary school pupils, most of them children of poor parents and severely punished at home. They were asked, " Would you punish a child for this or that fault? " (seven faults being named). Most of them said they would not, or would punish him only by advice, etc. Out of twenty thousand answers only three or four said they would punish the child.

The resolution adopted was as follows: " The Second Section finds that class discipline is allowable only under such forms and conditions as will not injure the free, self-governing individuality of the pupil. The best means of preserving such discipline are good external conditions in the schools and practical internal conditions in teaching. The Second Section condemns physical and other similar punishments as degrading both to the child's individuality and to the discipline as well as the other aspects of school life and calls upon its fellow teachers to acknowledge that the use of such punishments is lowering to the teaching profession and should be rooted out of educational practice." On this question all members were of the same opinion.

In our country education has not been compulsory and there are many illiterates even in large towns. In the country children often have to go six or seven miles in wind and rain, and one teacher may have one hundred and fifty or two hundred children in two or three divisions. The organization of the schools is also heterogeneous. Those organized by the priests are quite different in method and program from those of the Administration, and these again from those of the *Semstwo* or self-governing bodies. In recent years there has been a great longing among the Russian people for learning and the *Semstwos* have organized large school systems in some localities. Even the reactionary Douma has now voted that a compulsory system of education shall be organized and introduced. Naturally, the Congress had to criticize this new program of the school department and adopt another, more radical and more corresponding to the needs of a democratic regime:

" The state and the community should see to it that no member shall be deprived of at least an elementary education, and to realize this idea elementary education must be compulsory. Compulsory education can be introduced only if the schools are numerous, if books and other school apparatus are free, and if the external and internal conditions of the schools respond to the needs of the people. The school period should be lengthened according to local needs but should not be less than four years."

To prevent the people's school from being merely a school for the poorer classes, the Congress wished, as the first step, to unite it with the system of higher education, and voted that children who have finished the elementary school should pass without examination to the Gymnasium or Realschule. This is a beginning in carrying out the idea of a single school system which is entirely new in our country.

The Congress also voted as the child's right, the organizing of education below the seventh year, such as kindergartens, babies' asylums, homes, etc., which should be based on the principle of free education. There should also be a larger system of education for youth by means of libraries, clubs, motion pictures, institutions for youth, etc., in each town and village, which should also be centers of culture for adults.

But all these resolutions would have no particular bearing on the sad condition of school life in Russia had not the Congress also proclaimed the need of preventing child labor, for compulsory education and the prevention of child labor sustain each other and aid in realizing the true education of the people and in conserving their mental and physical powers. They voted therefore: "(1) It should be determinded upon and made law that no children under 16 should be employed in mills, factories or other places of work. (2) This law should also apply to children in trades and handicrafts, agriculture, mining, and also to children in any kind of work as well as to children in household work. (3) To carry out this law, the efficiency of factory inspection should be increased in all these places and representatives of the trade unions should be made factory inspectors." We thus see the Congress advancing from the pedagogical reasons into problems of social legislation.

I will touch upon only two other details of the program, the organization and education of teachers, and their culture influence upon rural communities.

I have already said that after 1906 the radical teachers' organizations were closed, and that those now existing have no right to discuss the serious problems of the teacher's life. The Congress voted the necessity of free organizations of a professional and educational character; that new courses should be introduced in Teachers' Academies; that courses in pedology should be established in Universities and that after completing the academic courses teachers should have a right to attend the Universities. The financial side of the teacher's life should also be changed. It is now intolerable, especially in the country schools. There are teachers getting 15 roubles or $5.00 a month! A new salary scale should be introduced which would not, even in the first years, be less than 50 roubles or $18.50 a month. Only by being better educated, better situated, and entirely free in teaching can teachers train and educate a free generation.

The country school teacher should be a leader in culture not only in matters of education but also in many other sides of country life. Each school and its teacher should be an educational center, with organized courses, lectures, excursions, choruses, etc., for adults. It is also well for teachers to belong to the local societies and to aid the fight against alcohol. The development of self-government and of social relations among the workmen and the peasants, which is now making itself apparent in the cooperative movement, should be supported by the teachers by actually taking part in this organization.

BOOK NOTES

The dramatic instinct in education. By ELNORA WHITMAN CURTIS. Boston, Houghton Mifflin, (c. 1914). 246 p.

The author of this book has taken the greatest pains with it and has several times visited Europe in the course of its preparation. The chief topics are the theatre-going of children, psychological aspects of the dramatic entertainment, dramatic work in schools and colleges, constructive efforts to provide good dramas, play, dancing, story telling, moving pictures, marionettes or puppet play, pageantry, together with a general summary. No book could be more timely and it should be in the hands of all in any way interested in the subject.

Manual of Play. By WILLIAM BYRON FORBUSH. Philadelphia, George W. Jacobs & Co., (c. 1914). 353 p.

Here we have a practical manual of plays and games. There are first directions about fitting up the play-room, home, yard, gymnasium, and then follow a discussion of the things children play and a schedule of their plays. We are told what children play at each age, plays of babies, balls, dolls, self-directed plays, laughter plays, plays that mimic life, social plays, pets, experimentation and observation, constructive games for out of doors, for girls, courtship plays, those of specific moral value, Sunday play, fifty play devices, and finally the meaning and value of play is discussed. The work contains eighteen full page illustrations.

A handbook of vocational education. By JOSEPH S. TAYLOR. New York, Macmillan, 1914. 225 p.

This work opens after an introduction with a long chapter on industrial education in the different countries of Europe, one by one, then discusses the difference between industrial and manual training. The intermediate school is next taken up, with its differentiated programs of study. Then come continuation schools, with part-time systems and then follow training of vocational teachers, the Prussian, Munich, Baden and other plans, vocational guidance, apprenticeship and compulsory education, with a concluding chapter which treats of dangers, errors, national aid, and finally topics for discussion and investigation, with a good bibliography. The appendix also contains a number of interesting articles.

Elements of general science. By OTIS WILLIAM CALDWELL and WILLIAM LEWIS EIKENBERRY. Boston, Ginn & Co., 1914. 308 p.

Science instruction in the first year of the high school has always been a very serious problem. The pupils do not have a large fund of information about common phenomena of nature. This work attempts to gather the results of many experiments made in different parts of the country for years with the purpose of organizing scientific methods of presentation which should be more educative. This work contains 33 chapters such as air, character changes, water, weather, composition of air, its relation to food, dusts, molds. Then come several chapters on water and its uses, while the third part deals with work and energy, part four with the world's crusts, part five with the life upon earth.

The Batavia system of individual instruction. By JOHN KENNEDY. Syracuse, N. Y., C. W. Bardeen, 1914. 299 p.

The Batavia System has been one of the prominent foci of educational interests for a long time and here its author gives us a long desired and needed characterization of what it really is and also of its extent geographically and the way in which it has influenced the community and modified methods of school life. It is not merely individual instruction, nor a device for helping backward children, nor is it designed to boost pupils, nor hostile to the graded system, nor a method of getting extra work out of the teacher, nor an excuse to add to the expense of education, although all these critcisms have been made against it.

Songs of the valiant Voivode and other strange folk-lore for the first time collected from Roumanian peasants and set forth in English. By HÉLÈNE VACARESCO. New York, Charles Scribner's Sons, n. d. 238 p.

The legends of one's country should belong to each citizen by birth. The writer has wandered from village to village to gather these strange, sweet stories. They live in our blood and not one single tale here has ever been included before in books of folk-lore pupils, so they are new to the public although they have lived for centuries in the souls of the Roumanian peasants where the charms of country life and ancient customs are not hushed by their great foe, civilization. Here Dacia survives. Some of these tales are Latin, others Asiatic, some of them are prose and quite a number are translated into poetry.

Indian days of the long ago. By EDWARD S. CURTIS. Illustrated with photographs by the author and drawings by F. N. Wilson. Yonkers-on-Hudson, World Book Co., 1914. 221 p.

This book of Indian life and tales is by a master and will be welcomed by everyone interested in the subject. The illustrations are copious, indeed on nearly every page, are well chosen, and cannot fail to give those who read the book a more intimate view of Indian life in the old days and to show that they are perhaps among the most religious of races.

Stories from northern myths. By EMILIE KIP BAKER. New York, Macmillan, 1914. 276 p.

We have here in 28 chapters or sections a very telling series of stories concerning Loki, Siegried and the Dragon, the Valkyrie, Gunther, Brunhilde, Kriemhild and the rest. There are already a number of good books in this field, and the last ought to be the best, and the writer of this note is inclined to think it is.

Foreigners' guide to English. By AZNIV BESHGETURIAN. Yonkers-on-Hudson, New York, World Book Co., 1914. 268 p.

The thought which prompted this book is a new and happy one. It is not exactly a high grade primer but it is a series of scores of lessons with a vocabulary of all the words used in them. The material is wisely selected from practical, every-day life. This book is especially important in view of the recent suggestion made that all foreign adults below a certain age should be required to attend evening courses in English as a condition of admission to the country.

Latin America. Clark University Addresses, November, 1913. Edited by GEORGE H. BLAKESLEE. New York, G. E. Stechert & Co., 1914. 388 p.

This volume contains no less than twenty-nine addresses by eminent authorities given at Clark University during the conference on Latin America which was held in November, 1913. It was edited by the director and organizer of the conferences, Professor George H. Blakeslee.

Germany and England. By J. A. CRAMB. Introduction by the Hon. Joseph H. Choate. New York, E. P. Dutton & Co., 1914. 152 p.

This book consists of four lectures on the problem, English interference, German history and literature, the problem being whether Germany shall succeed England. Then comes the problem of peace or war, with the German views of war. Treitschke and young Germany follow, and then comes a general glance at the past and the future, especially of England, and Napoleonism in Germany.

The Oberlehrer; a study of the social and professional evolution of the German schoolmaster. By WILLIAM SETCHELL LEARNED. Cambridge, Harvard University Press, 1914. 150 p. (Harvard Studies in Education, v. 1.)

The *Oberlehrer* is selected as a model of a professionally trained teacher and the author has spent nearly two years in Prussia, Saxony and Baden to render himself competent for this work. Three long chapters are given to the history of the schoolmaster, beginning with 1500, while the last two chapters, which are the most valuable, are devoted to the *Oberlehrer* of to-day.

Abraham Lincoln's cardinal traits; a study in ethics. With an epilogue addressed to theologians. By C. S. BEARDSLEE. Boston, Richard G. Badger (c. 1914). 244 p.

We are first told of Lincoln's energy and earnestness and then of his respect for law, conscience, liberty, free will, love, life and truth, the cardinal virtues, his moral mission, how he was related to the problems of beauty, pessimism, government, mercy, meekness, reality, evil, religion, persuasion, and his personality is represented as the problem of psychology.

Mentally defective children. By ALFRED BINET and TH. SIMON. Authorized translation by W. B. Drummond. With an appendix containing the Binet-Simon tests of intelligence by Margaret Drummond, and an introduction by Alexander Darroch. New York, Longmans, Green & Co., 1914. 180 p.

It is high time to have this translation accessible in English since the Binet-Simon tests of intelligence have already had a very wide use. After the introduction, this work treats some general features of the psychology of defectives, then methods of examination and educational and social return of schools and classes for defectives.

School training of defective children. By Henry H. Goddard. (School Efficiency Series.) Yonkers-on-Hudson, World Book Co., 1914. 97 p.

This interesting and able work, one of the best so far published in this series, discusses existing conditions in New York, what is done for children in ungraded classes, their school-room and equipment, teachers, subdivision, suggestions from principals and teachers, importance of the problem, its solution, with final recommendations.

Symbolic teaching or Masonry and its message. By Thomas Milton Stewart. Cincinnati, Stewart & Kidd Co., 1914. 242 p.

This is a book on Masonry for non-Masons and we are told how it is connected with antiquity, with the higher evolution of man, the Cincinnati Masonic study school, why Rome is opposed to it, personal effort, Jacob's ladder, how to be a "high up" Mason, why guardian of liberty, our belief in another life, etc.

The demonstration play school of 1913. By Clark W. Hetherington. (University of California Publications, Education, Vol. 5, No. 2, pp. 241-288). Berkeley, University of California Press, 1914.

Dramatic readings for schools. A practice book in dramatics. By Marion Florence Lansing. New York, The Macmillan Company, 1914. 242 p.

The Young and Field literary readers. By Ella Flagg Young and Walter Taylor Field. Books 3 and 4. Boston, Ginn & Co. 2 v.

Erziehung zur Arbeit. Von Edvard Lehmann. Leipzig, B. G. Teubner, 1914. 86 p.

The effect of practice upon visual apprehension in school children. By Karl M. Dallenbach. (Reprint from Journal of Educational Psychology, June and September, 1914, p. 321-334; 389-404.)

Minor studies in learning and relearning. By David Spence Hill. (Reprinted from Journal of Educational Psychology, September, 1914, p. 375-386.)

Efficient causes of crime. By Rufus Bernhard von KleinSmid. A lecture delivered at National Conference on Race Betterment. Battle Creek, Michigan, January 8, 1914. 12 p.

War's aftermath; a preliminary study of the eugenics of war as illustrated by the Civil War of the United States and the late wars in the Balkans. By David Starr Jordan and Harvey Ernest Jordan. Boston, Houghton Mifflin Co., 1914. 104 p.

Eternal peace, and other international essays. By Immanuel Kant. Translated by W. Hastie, with an introduction by Edwin D. Mead. Boston, World Peace Foundation, 1914. 179 p.

Prize orations of the Intercollegiate Peace Association. Edited with an introduction by Stephen F. Weston. Foreword by Charles F. Thwing. Boston, World Peace Foundation, 1914. 185 p.